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Telecommunications Sector Gets High Priority

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[Article by Leon Baya: "MTS: Investments of 2.5 Billion Rupees Over 4 Years"]

[Text] Approximately 2.5 billion rupees will be invested in telecommunications during the 1989-1992 period, placing the sector at the top of the hit parade in terms of public-sector investments. The master plan of "Mauritius Telecommunication Services, Ltd." projects a telephone network with a 200,000-line capacity for 1993, compared to 60,000 today.

According to the president of MTS's management committee, Mr Daby Seesaram, the development plan of the telecommunications service provides for equipping the network with a 100,000-line capacity between now and April of 1990. This will be done through the installation of three new exchanges (a total of 30,000 lines) by the Japanese firm NEC and the extension of existing exchanges (10,000 new lines). At the same time, MTS will get rid of 5-digit lines. Toward the end of the year, the entire network will be equipped with 6-digit lines. The NEC exchanges will be equipped with 7-digit lines.

Mr Seesaram indicated that the 6-digit lines will allow numbers for 400,000 subscribers. However, according to MTS forecasts, the number of subscribers will exceed 400,000 in 30 years, making it necessary to have 7-digit lines. There are presently 48,000 telephone subscribers in Mauritius.

As indicated above, besides the installation of the NEC exchanges at the beginning of next year, the MTS has written into its development plan the modernization of three existing exchanges (Port-Louis, Rose-Hill, and Floreal) operating on the "Strowger" electromechanical system. The project to replace these exchanges, which have a total capacity of 20,000 lines, also includes the installation of 10,000 new lines.

The project will be financed using a 92-million French franc (about 210 million Rs) line of credit granted by the CCCE (Central Fund for Economic Cooperation); the French firm Alcatel will equip the exchanges. The agreement concerning this line of credit was signed yesterday morning by the Finance minister, Mr Vishnu Lutchmeenaraidoo, (the government is guaranteeing the loan), Mr Phillipe Proust, manager of the Central Fund in Mauritius, and Mr Daby Seesaram, president of Overseas Telecommunication Services (OTS). The funds will be retroceded by OTS to MTS, which will responsible for executing the project at the same rates and within the same time frame set by the terms of the agreement: reimbursement in 20 years, with an amortization deferral of 7 years and an interest rate of 5 percent a year.

The project also aims to speed up the development of 60 villages by setting up a system of electronic radio relay outes. The MTS has also hired the services of the firm Sofrecom to draw up a master schema for computerization.

For the finance minister, the investments in the telecommunications sector are hefty, but, he stressed, "they are the price Mauritius must pay if it wants to transform itself into a regional center for exportation of goods and services." Mr P. Coste, French ambassador, commented that the 210-million rupee loan was the highest granted thus far by the CCCE and further pointed out that it included a grant component of around 75 million Rs.

CZECHOSLOVAKIA

Second INTERSPUTNIK Ground Station Built in CSSR

24020018 Prague PTT REVUE in Czech Nov-Dec 88 pp 166-168

[Article by Eng Vaclav Zvonar: "Second Ground Station of the INTERSPUTNIK System in Czechoslovakia"; first paragraph is PTT REVUE introduction]

[Text] Toward the end of August of this year, the second Czechoslovak ground station of the INTERSPUTNIK system of cosmic telecommunications was activated. Its development is proceeding in two stages. During the first stage, the problem is to assure the temporary reception of television signals from channel 10 of the Stacionar 13 satellite with equipment located in a container. This stage was concluded on 18 August 1988 when comprehensive verification tests were carried out and when the installation was placed into operation on the basis of the temporary approval of the management of INTERSPUTNIK. It is anticipated that, in conjunction with the agreement, final approval will be issued at the session of the Intersputnik Council in October of this year. During the second stage, it is expected that the installation will be augmented so as to assure duplex television and telephone operations by the end of 1989.

Before discussing the more detailed data pertaining to the station, let us return to history.

Cooperation with the Soviet Union in the area of cosmic communications dates back to the year 1966 when, on the basis of an offer by the USSR, a program for scientific cooperation involving the socialist countries in the area of space research and space applications, designated INTERKOSMOS, was accepted and which also encompassed the problem of space telecommunications. A number of research projects from the area of space communications, which were carried out within the framework of the INTERKOSMOS program, have found application in practice. The most express example of this experience is the international system of space telecommunications, referred to as INTERSPUTNIK.

The international Intersputnik organization was established in 1971 as an open international organization, open to membership by any nation, provided it pledged to abide by the provisions of the Agreement To Create Intersputnik, dated 1971. The goal of the organization is to secure for member nations and other nations telecommunications with the aid of space technology and to thus afford them the opportunity for an operational, reliable, and highly economical method for transmitting information over great distances.

In 1971, nine socialist countries were the founding members of Intersputnik. They were Bulgaria, the GDR, Cuba, the Mongolian People's Republic, Hungary, Poland, Romania, Czechoslovakia, and the USSR. Currently, the organization has 15 members; in addition to those already named, they are Afghanistan, the People's Democratic Republic of Yemen, the Korean People's Democratic Republic, Laos, Nicaragua, and Vietnam. Upon completion of formalities, Syria will also become a member. However, the technical means of the INTERSPUTNIK operational system are utilized actively not only by its members or the owners of ground stations such as Algeria, Iraq, Kampuchea, Japan, and the United States, but by many other countries (France, Italy, Spain, etc.) through the use of transit channels.

Currently, a total of 23 ground stations are functional in the system and 2 others are being planned, in Libya and in Angola. The ground stations use two satellites located in geostationary orbits. One covers the region of the Atlantic Ocean and is located at 14° West longitude (Stacionar 4), the second, located at 80° East longitude (Stacionar 13), covers the region of the Indian Ocean (see Figure 1). Aboard each satellite, INTERSPUTNIK has rented broad-band channels for the transmission of television, radio, and telephone circuits. Stacionar 4, with which 13 stations operate, utilizes two channels for the transmission of television signals and two for the transmission of telephone circuits. Stacionar 13, in whose area 10 stations operate, utilizes a single television and a single telephone channel.

In the beginning, Intersputnik was a budgetary organization. Annual contributions during the early years were the same for all countries; later, they were differentiated in conjunction with the volume of operations undertaken by each country. Beginning in 1983, Intersputnik became a commercial organization based on the principle of cost accounting (khozraschet). Revenues for utilizing the system cover operational expenses for the system and other expenditures of the organization; the final balance of the organization is a profit balance ranging between 20 and 30 percent. Part of the profits is distributed among member countries based on the extent of operational utilization of the system by these countries. The current financial situation of the Intersputnik organization can be designated as being fully stabilized and, given the gradual increase in the membership base, it is possible to anticipate a greater increase in the volume of operations. The participation of Czechoslovakia in the Intersputnik organization is profitable; the overall revenue Czechoslovakia derives from the organization has already balanced both the volume of Czechoslovakia's contribution during the initial phase, as well as the one-time contribution to the statutory fund, made in 1982.

Czechoslovakia participated in the work involved in the creation and expansion of INTERSPUTNIK from the very beginning. Not long after signing the Agreement To Create Intersputnik in 1971, a contract was signed for the delivery of technological equipment by the USSR for a Czechoslovak ground station which, after completion,

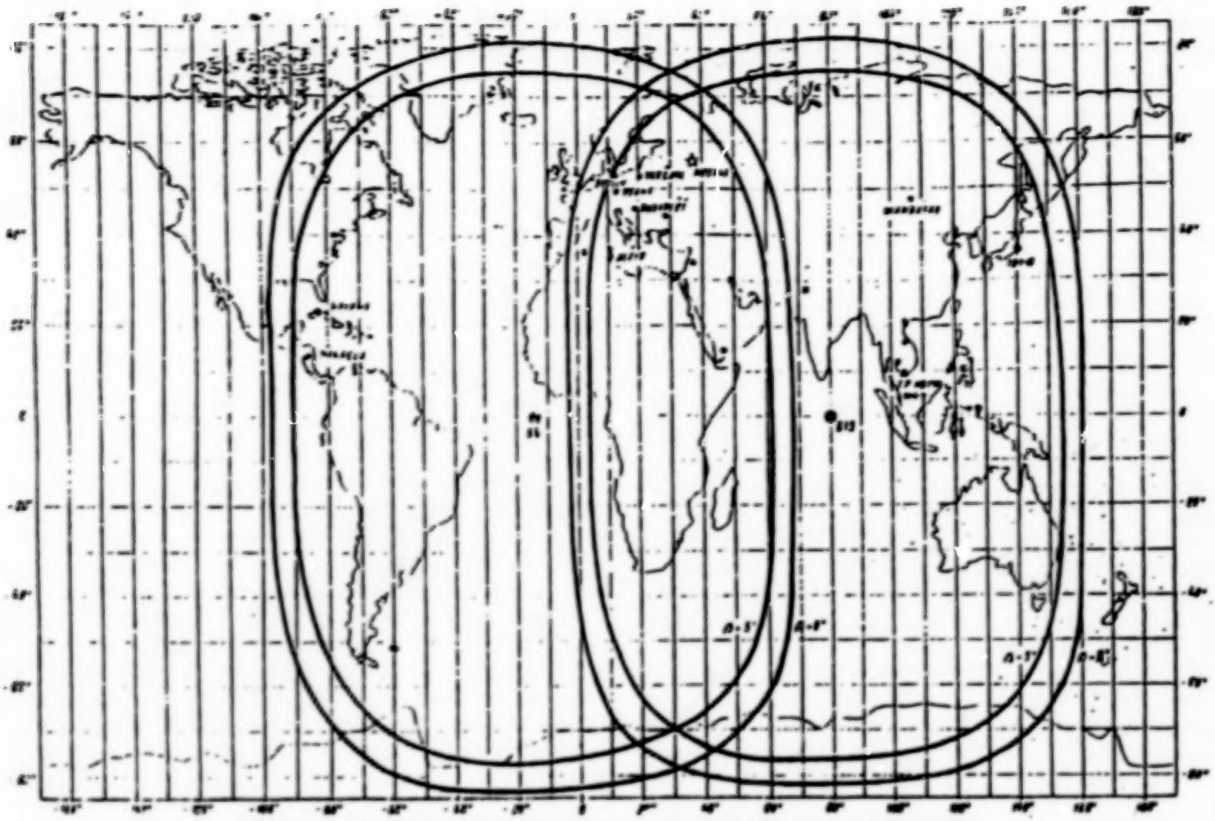

Figure 1. Earth Coverage from Stacionar 4 and Stacionar 13 Satellites

became the first ground station for INTERSPUTNIK in central Europe and was the third in line in the system, following the USSR and Cuba.

Thanks to assistance received from the USSR, television reception was initiated as early as 1 May 1974 and telephone operations began 1 February 1976.

In the beginning stage, the system operated with the assistance of a MOLNIYA-type satellite and had an elongated elliptical orbit. The ground stations were equipped with Soviet-made equipment, derived from the equipment used on the ORBITA satellite for a single television and a single telephone channel. The gradual expansion of operations of the system led to additional technical development of the system and, toward the end of 1979, the transition was made toward operating from a geostationary satellite of the Stacionar type. Between 1983 and 1984, the majority of ground stations operating in the zone of Stacionar 4 were expanded and modernized.

Modernization of the Czechoslovak station was undertaken by the Czechoslovak Directorate of Communications in two stages. In the first stage, the parametric amplifiers, the guidance system, and the antenna reflector feed were exchanged. In the second stage, the waveguide tract was expanded to operate four channels, and assembly of Grunt and Gelikon transmitters was accomplished. At the same time, MDVU-40 terminal equipment was installed for the transmission of telephone channels utilizing the time ceiling aboard the satellite (as opposed to the existing Gradient-N equipment which is based on frequency division). Furthermore, the television transmitter was retuned from channel 10 to channel 9 and channel 7 was equipped with receiver equipment. The results of the modernization were a substantial increase in the quality of operations and in increased efficiency of utilization pertaining to the leased channels involved in telephone operations.

From the first television transmissions and from the organization of the initial telephone international circuits, operations taken care of by the Czechoslovak ground station have substantially increased, particularly with regard to the number and length of television transmissions. This is particularly due to the fact that the technical means of INTERSPUTNIK currently account for more than 60 percent of television transmissions between member organizations of the OIRT. For Czechoslovakia, there is great significance in the fact that it is the host country for these international television and radio organizations, including their technical and program coordination centers. Thanks to this, the utilization of the technical means at the disposal of the Czechoslovak Directorate of Communications and, thus, also the profits based on their operations, are growing. On the other hand, however, there is the obligation to create, for members of the OIRT, suitable conditions, for example, to facilitate simpler, more reliable, and more

operational coordination involved in the exchange of television topics between countries of the western, central, and eastern regions of the Intersputnik organization.

Apart from the above-listed considerations, the decision to build a second Czechoslovak ground station for the INTERSPUTNIK system was motivated by the following experiences:

Currently, transit transmissions between the Atlantic and Indian Ocean regions of INTERSPUTNIK are handled only by two ground stations located on USSR territory. However, the distance between the two stations is several hundred kilometers;

In view of the favorable geographic position occupied by Czechoslovakia, the Czechoslovak station will make it possible to handle transit transmissions from the area of the Indian Ocean to the countries of western and central Europe;

Transit transmissions involving both zones of the INTERSPUTNIK system are accomplished from a single location, without utilizing any additional territorial communications means;

Czechoslovak interest in expanding space telecommunications, motivated by the effort to improve the quality and expand the Czechoslovak international telecommunications system.

Preparations for the expansion were initiated in 1986. During 1987, the design proposals for the structural expansion of the Czechoslovak ground station were completed, as were the proposals for its technical equipment.

The structural expansion of the Czechoslovak ground station to handle communications with the eastern region of the INTERSPUTNIK system, which will be realized during the second stage of expansion, is based on the existing technological area and the social hinterland which exists at the Sedlec radio communications station. As a result, it was possible to hold requirements for construction work and for a growth in manpower to a minimum and to take care of the obligations of the Czechoslovak Directorate of Communications at the lowest possible cost in capital expenditures. The solution is based on the installation of a new independent east wing, tied directly to the circuit portion of the existing station facilities. The latter create a natural functional center for the new project, as can be seen from Figure 2. As a result of this solution, an overall balance and symmetry of the composition was achieved in contrast to the existing status when an asymmetric west wing was added to the circular central building. The existing operations of the station will not be disrupted by the construction of the new portion, since all construction activity will be carried on outside of the existing facility and the only connection between the two buildings will be an opening in the existing structure.

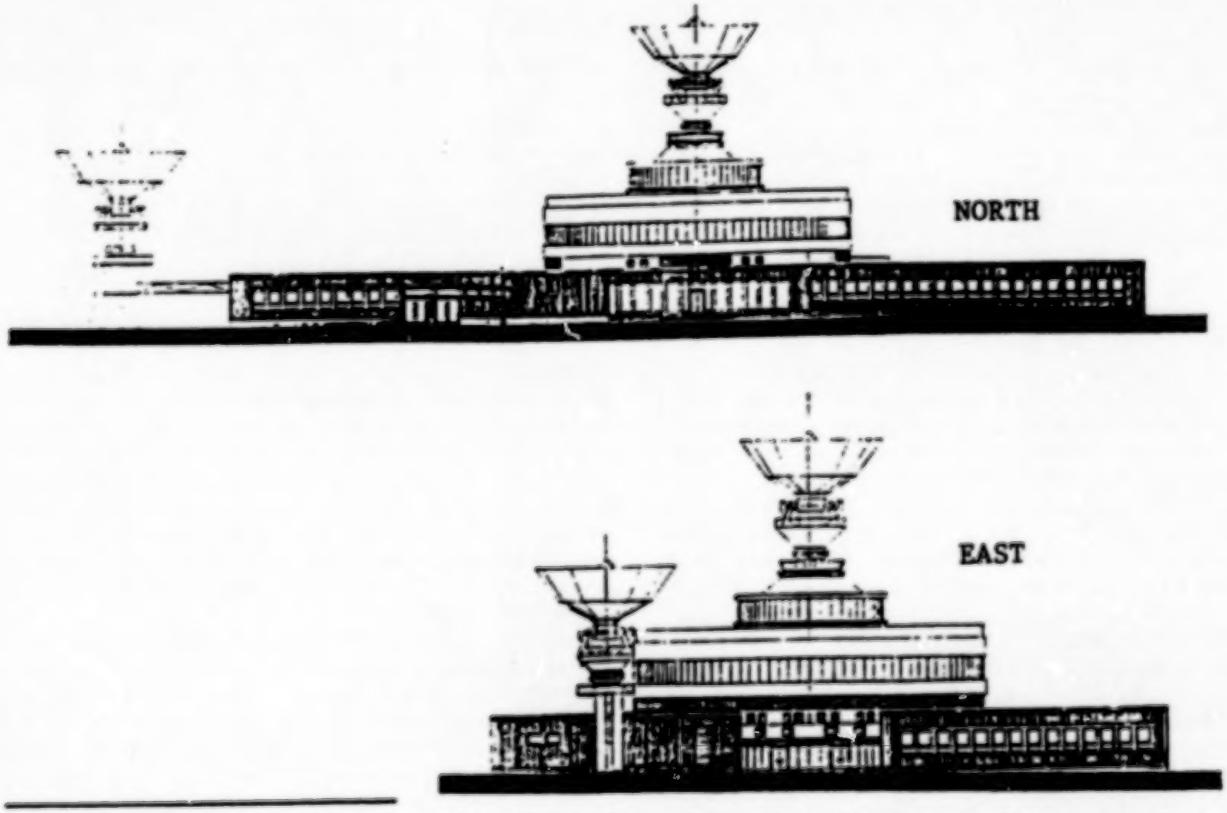

Figure 2. Ground Station After Completion of Second Stage of Expansion—View From the North and the East

The 12-meter-diameter antenna is located in a separate block in such a manner that the elevational axis of the antenna is approximately 7.2 meters above the surrounding terrain. Because the working operational angle of the antenna is approximately 8°, the lower edge of the antenna will be only about 1.5 meters aboveground. But even under these conditions, all parameters of communications will be in line with the technical standards of Intersputnik regulations.

In 1987, a contract was concluded with the USSR for the delivery of technological equipment for the station to facilitate the reception and transmission of television signals and duplex telephone operations, excluding terminal telephone equipment. Here, it is anticipated that, in conjunction with developmental materials developed by the Intersputnik organization, use will be made of Hungarian INTERCHAT equipment. The apparatus works on the principle of "a single channel for carrier frequencies," utilizes PCM and ADPCM modulation, and facilitates cooperation with SCPC equipment which is utilized in the INTELSAT system. The equipment makes it possible to advantageously create telephone circuits in specific directions having a small number of channels, as is anticipated in accordance with existing operational requirements. More detailed technical data on the establishment of the second Czechoslovak ground station will be found by interested readers in the October 1988 issue of the journal TELEKOMUNIKACE, in the article written by Frantisek Sebek and entitled "Permanent Satellite Service in the INTERSPUTNIK System."

For the Czechoslovak Directorate of Communications, a second ground station not only signifies an increase in operations involving the exchange of television topics with countries of the eastern zone, but also the creation of additional transmission pathways between Moscow and Prague. Apart from terminal operations, the Czechoslovak ground station will, once it is completed, be able to assure transit duplex television transmissions and telephone circuits. Even if, during the current period, stations in the Afghan Democratic Republic, in the Korean People's Republic, in Laos, in Mongolia, in Vietnam, in Kampuchea, in Japan, and the USSR are operating in the zone of the Indian Ocean, it is possible to anticipate, on the basis of preliminary information, that additional stations will be built in China, India, and elsewhere. According to the OIRT, the exchange of television programs involving the Asian-Pacific Broadcast Association (ABV) should be possible through the actions of one of the Asian countries. It is further anticipated that television transmissions will be exchanged with Japanese broadcasters and television organizations (ASAHI and NHK), which have become associate members of the OIRT.

All of this creates the prerequisites for letting the Czechoslovak Center for Satellite Telecommunications become an important international telecommunications center for the Atlantic and Indian Ocean regions.

Development of Digital Switching System Surveyed

24020011 Prague TELEKOMUNIKACE in Czech No 11, 1988 pp 163-165

[Article by Eng Emanuel Prager, candidate of sciences, TESLA Research Institute for Telecommunications, Prague: "Development of the JSPST-N Digital Communications System"]

[Text] The No 3 issue of this journal in 1986 presented the overall direction of work being conducted in Czechoslovakia with respect to the development of digital communications systems and, primarily, regarding the development of the JSPST-N system as the national variant of a unified JSPST system developed within the framework of international collaboration among CEMA countries. That article also listed the basic principles used in solving the system as a whole and for some of its more significant modules. This system, which is intended to modernize the Czechoslovak communications net through the use of local centrals having medium capacities of up to 8,000 subscriber circuits (possibly even having capacities in excess of 10,000 subscriber circuits) utilizing digital switching equipment was gradually being further developed in the TESLA enterprises and, in 1987, two prototypes of a public and private branch exchange having a capacity of 500 circuits were developed and are being systematically verified at the TESLA Karlin and TESLA Liptovsky Hradok enterprises and will subsequently be subjected to prototype testing within the communications network.

The present article deals primarily with the evaluation of the current status of development and outlines future prospects for production as well as additional innovative steps.

Fundamental Characteristics of the JSPST-N System

Development of the JSPST-N system has undergone a number of developmental phases with its basic concept and structure, which were adopted at the beginning of development and were discussed in the above-mentioned article, having virtually remained without change except that some portions of the system experienced partial changes caused by solutions, by rendering requirements more precisely, and as a result of technological reasons. Similarly, the results of tests in the individual developmental phases brought about some partial changes.

The basic characteristics of the system involve a modular structure utilizing microprocessor control and digital switching. The modular structure makes it possible to consider the system to be open from the standpoint of its further expansion as to capacity and function. The

modular structure of the system makes it possible for it to be adapted, in the future, for use in the ISDN network in conjunction with the international recommendations of the CCITT and in accordance with worldwide trends.

If we speak of a modular structure, this means that the individual modules are connected to the common communications field of the central via their unified interfaces, which in turn switches the signals at a transmission speed of kbit/sec without regard to whether these signals carry voice or data information. Thus, the communications field is transparent from the standpoint of transmitting various types of information. The individual modules connected with this communications field have standard output ports despite the fact that they take care of various functions in the communications network and can operate both in the voice mode and also in the data transmission mode. This basic structure is actually a logical consequence of the development of various principles of controlling the communications system and of the development of microelectronics. The modular structure not only presents the possibilities for a simple expansion of the system, but is also advantageous from the standpoint of programming, which can be proposed and changed independently for the individual modules. Actual cooperation between the modules is accomplished asynchronously through the system of information passed between the modules.

In utilizing this modular structure, the individual modules are so designed as to be uniform from the standpoint of equipment as well as programming and suitable for various types of systems use (public or private centrals and for various sizes of centrals), as well as for various network applications. For the sake of completeness, let us list the present set of individual modules which form the basis of the system and which can be utilized in various combinations for various centrals (Table 1). Several of the listed modules may even have several built-in variants, for example, the module for analog circuits can be fabricated in a number of variants to handle various types of signals in analog channels; the module for analog subscriber circuits can have several versions for various operational loads and, thus, even a varying number of attached circuits at its standard interface with the communications field, that is to say, a multiplex bundle of 32/30 PCM channels. Similarly, for the private branch exchange version of the system, several typical modules can be augmented; for example, the module at the work site of the communicator. The possibility of a variable solution also holds true for some systems modules, for example, the module for servicing and oversight can be simpler or more complicated depending on whether it is intended to handle simple functions in an unmanned small secondary central or functions of a centralized maintenance center in a key central.

Table 1. Listing of Basic Modules for the JSPST-N System

Module	Purpose	Size or Characteristics
AUS	For attaching subscriber circuits	For attaching 128 circuits at an operational load of 0.15 Erl/pp
ASV	For attaching analog communications circuits	For attaching 30 nf channels carrying various types of signals
DSV	For attaching a digital cable	for 30 digital PCM channels
CSP	Communications field (duplicated)	To accommodate 1,024 x 1,024 channels with the possibility for building in 512 or 2,048 and 4,096 channels
CI-DT	Central source of pulses and digital tones (duplicated)	With the possibility of external synchronization
KPV	Code transmitter and receiver (duplicated)	For R2 codes (or even R1 codes)
RVI	For control of information exchange (duplicated)	Interconnects 16 channels among modules
PAPI	Memories of operational information (duplicated)	To register selected numbers, categories, etc.
KN	For conference purposes and connection purposes	For connections between switching facilities or to facilitate conferences between several circuits
OD	For servicing and oversight (duplicated)	For communication between maintenance personnel and equipment, for evaluation of diagnostics, billing, etc.
PST	For operational testing and for testing of attached circuits	Makes it possible to test the system while in operation or as ordered by Module OD

Note: Module OD has several items of peripheral equipment attached to it, such as a keyboard, a printer, a display monitor, etc.

Individual modules appear in the central more frequently according to size and operational loading to which the central is subjected. This is true not only of line modules, whose number is directly dependent upon the magnitude of the central, but also of common modules, for example, the memory module for operational information, whose numbers depend not only on the magnitude of the central, but also on the network connection and the functional parameters of the central.

Current Status of Development Pertaining to the JSPST-N System

In 1987, two prototypes, a subcentral and a private branch central, were produced and can handle 500 circuits each; they were gradually activated and subjected to the necessary tests and measurements, at first

on the premises of the producing enterprise, TESLA Karlin (public central) and TESLA Liptovsky Hradok (private branch exchange), and later will be patched into the communications network for purposes of test operations.

As an example, Figure 1 provides the block diagram of the prototype of the substation (secondary central) for 512 circuits, 120 analog channels, and 2 PCM bundles (that is to say, 60 digital channels). Figure 2 indicates the positioning of modules on the substation rack. It should be added that this positioning is not typical and that there are some modules here which will be used only in larger centrals; some racks are not fully occupied or the number of modules does not correspond to the actual size of the central. The total number of racks for a central having 512 circuits will actually be smaller.

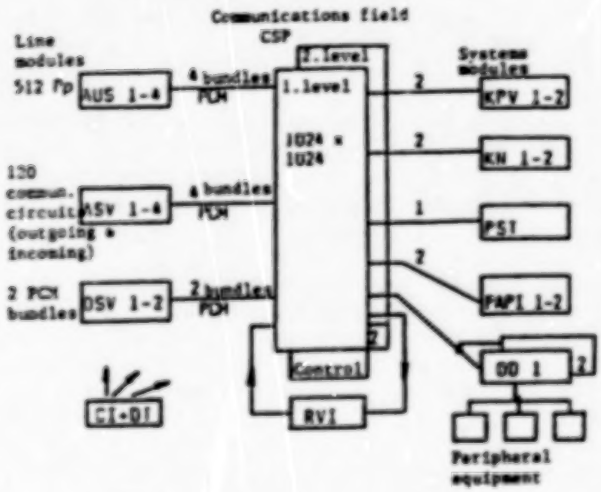

Figure 1. Block Diagram of the Prototype Substation of the JSPST-N System

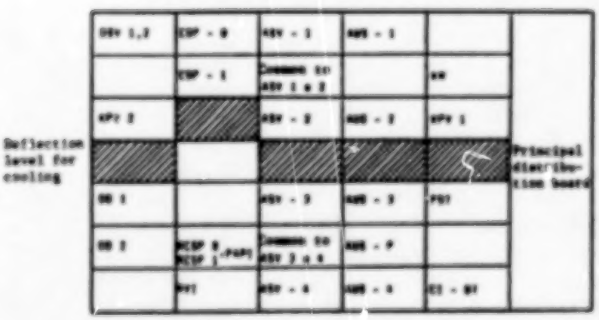

Figure 2. Positioning of Equipment on the Racks of the Prototype of the JSPST-N System

During the course of the prototype tests conducted hitherto in the laboratories, the individual required functions were tested and various statistical tests and measurements of electrical and nonelectric parameters were conducted. During the course of statistical testing, which was intended to verify the failure rate of the centrals, the number of calls, generated both from automatic sources and also as the result of supplemental operation by telephone instruments, gradually increased. The statistical tests also led to the uncovering of some defects which were gradually removed. Gradually, an overall failure rate of less than 1 percent was achieved.

The prototype was subjected also to tests of its cooperation with the public network by connecting it with prototypes of the PK202 and P51 systems. Verification of cooperation involving various types of signals through ASV and DSV modules with the attachment of PCM bundles was also conducted.

Part of the tests of the prototypes involved various measurements. One of the basic measurements was the measurement of interference. Modern electronic communications systems are not only a source of interference, but are also sensitive to interference arising within the system, as well as to interference from outside sources. It is, therefore, necessary to make the required provisions for minimizing all types of interference by suppressing their sources, possibly by adding filtration at various locations within the system. This is aided also by thorough grounding and shielding of parts which cause interference. Measurements conducted on the prototypes showed a relatively high level of interference in the early period and it was, therefore, necessary to take a series of measures designed to suppress this interference. In this regard, a great role was played by power sources and by common power feeds.

Another type of measurement involving the prototype was thermal measurement which was intended to indicate thermally stressed locations in the central, as well as the distribution of temperatures in the equipment racks and on circuit boards having flat circuits. It is well-known, and foreign experiences also speak of this, that by increasing the concentration of electronic components in an equipment rack and on circuit boards, the temperature within the rack rises and leads to the undesirable warming of components and, thus, to deterioration in their reliability. The measurements showed that, in the majority of cases, results were satisfactory. In some cases, circuit boards were redesigned with the objective of reducing the amount of heat stress to which they are subjected.

Diagnostics Pertaining to the JSPST-N System and the Reliability Results Attained

The diagnostic system for determining defects is assured primarily through programming. The technical equipment only has sensing elements to detect erroneous functions within the modules and means for closing

down control loops. Intramodular diagnostics are basically divided into several tasks, facilitating both the preventive testing of modules, for example, an automatic test of the control unit, and also the generation of defect reports and supplemental localization of the defect in the event the actual preventive testing is inadequate.

The assurance of all diagnostic tasks in the individual modules is, for the time being, uneven in the prototype. In some modules, it is already 80-percent complete; in others, it is, for the time being, substantially below that level. The diagnostic programs will be gradually augmented within the course of prototype tests because they are, to a substantial extent, dependent on the types and distribution of defects which can show up during testing.

The principal function of systems diagnostics is handled within the system by the service and oversight module in cooperation with the operational testing module. To make the evaluation of defect reports arriving at the service and oversight module easier, a defect glossary has been worked out which contains approximately 160 types of defect reports during the prototype activation phase (this number will be increased). To evaluate these reports, a program was worked out to receive such reports in the OD module, and a program was worked out for questioning the module status. Constantly greater attention is devoted to systems diagnostics during development in view of the fact that the maintainability of the system will depend on this function to a great extent.

Computations of reliability, based on the failure rate of individual components, indicate that the average time between defects is approximately 270 hours for the substation prototype with a capacity of 500 circuits. From this, the calculated time required for maintenance, computed for one circuit and 1 year, is approximately 0.2 hour per circuit per year.

The average time between defects of individual modules varies between 2,800 hours (AUS module) and 14,000 hours (KN module). On average, this value is around 4,000 hours for individual modules. With regard to the AUS module, this failure rate is shared primarily by subscriber sets (their number within the module is 128), whose failure rate does lead to the necessity to exchange circuit boards or to repair them, but does not lead to a breakdown in the system.

The overall computed probability of a breakdown as a result of the failure of central organs (the duplicated communications field or the common modules for control) is 1.05×10^{-4} with the average time required for defect repair being 0.5 hour. The calculated number of defects for a central with 6,000 to 8,000 circuits is 3.5 defects per 100 circuits per year.

From the above computations, which will necessarily have to be verified by longer tests in the operation of communications, it is evident that the failure rate of the JSPST-N system, in terms of its individual indicators, is only a little worse than the values noted for foreign products. With the passage of time, it is expected that electronic components will improve and their quality will rise, resulting in a lowering of the failure rate which must necessarily be reflected in lowering the fundamental indicator, that is to say, the number of defects per 100 circuits per year.

Future Prospects of Development Pertaining to the JSPST-N System

Tests of the prototype substation and private branch exchange central are to be concluded in 1988 in the enterprise test series and in 1989 it is planned to initiate test operation within the communications network.

Parallel with this work, there will be development of a main central, including the junction component and development of the VAUS module (subscriber concentrator) so as to accomplish an integrated system for junction-type networks to be used in rural as well as urban service.

During the subsequent course of development, the inclusion of CENTREX-type services will be monitored which should facilitate a fundamental change and the overall conception of private branch exchange service equipment and its inclusion into the public network.

Another important question is that of the possibility of increasing the maximum capacity of centrals. The JSPST-N system, as currently configured, is capable, on the basis of the capacity of its central, of handling up to 10,000 circuits in the public network (perhaps even more with lower operational loading), or it can do the work of junction centrals of equivalent size or the work of combined centrals. Increasing the capacity of the central above these limitations with regard to the structure and configuration of the digital communications field will depend, on the one hand, on the availability of special microelectronic circuits for the communications field or upon the development of a JSPST system developed in international cooperation.

Given the overall development thus far and further innovations of the system, the possibilities of developments in microelectronics will, understandably, also be monitored. This development can be manifested both in the introduction of 16-bit control units and also in the configuration of some typical components of the system (for example, the introduction of circuits having a higher degree of integration by combining the filter and coding circuits into one, etc.) in subscriber sets. Similarly, it is expected in the future that the communications field will utilize special integrated circuits which should make it possible to find more economic solutions and to expand the capacity of centrals. In the current components base, further development will adapt to and result in the gradual introduction of the production of new types of microelectronic circuits, for instance, the high-speed CMOS series which will lead to an overall reduction in

the consumption of power, fabrication of gate field circuits resulting in the obtaining of special circuits for the overall purpose of simplifying the circuitry of individual components of the central, etc.

For the future integrated ISDN network, development of supplements to the JSPST-N system so as to serve the ISDN network will also begin within the framework of follow-on work. The concept of an integrated ISDN network is understood today to be the entire complex of equipment, centrals, transmitters, centralized facilities, and a number of terminals, making it possible, on the basis of the present telephone network (which is the most widespread), to assure participants in the network both a telephone connection and also various types of data transmission and, in the future, even video transmission for purposes of accomplishing mutual connections and for distribution, for example, of television programs, etc. It is anticipated that ISDN networks will gradually provide an ever growing number of subscribers with the possibility of attaching various terminals in government offices, in homes, etc., and providing them with the possibility of being connected with various centralized services.

From the standpoint of new services and the possibilities of their gradual realization in communications systems and in networks, ISDN services are today divided into narrow-band services, based on the transmission possibilities of a single PCM channel, that is to say, they have a transmission velocity of 64 kbit/sec, and wide-band services for the transmission of pictures with a transmission velocity which is one or more degrees of magnitude greater.

A digital communications system for future utilization within the narrow-band integrated networks must, therefore, have the following minimum augmentations:

It must be expanded by modules permitting the attachment of various terminals, but primarily of data terminals.

It must have adequately accurate synchronization to facilitate operation of digital centrals in major networks.

It must have a suitable signaling system between centrals (No 7 of the CCITT recommendations).

It must create transition facilities for existing data networks so that it would be possible to utilize them after the transition period and within the expanding ISDN network.

From the structure of the JSPST-N system and from the analysis of future ISDN services and methods for their possible integration into digital communications systems it is evident that the JSPST-N system in today's configuration with its open structure will facilitate the future integration of additional function modules to make it possible to utilize ISDN services. The integration of these new modules will be based on the requirements of communications for the gradual expansion of these services and will stem from the possibilities of assuring the necessary microelectronic components base. The integration of services within narrow-band networks will result in some other views of the question regarding the operational loading of the system and of the network, it will result in other views regarding the question of tariffs, etc. The solution of these questions will be particularly important during the initial phases of ISDN service realization, which will, most likely, first be accomplished in private branch networks, in which the limitation of operations and tariff questions do not play such an important role.

The article describes the status of development of the digital communications system designated as the JSPST-N during 1988 and outlines existing results and prospects of further development. Even though the developmental stages accomplished thus far have shown up several problems, it is clear that the direction of the work has been correct and that it is possible to anticipate that, following the conclusion of development and the introduction of production, this system will represent a contribution to the modernization of the Czechoslovak telecommunications network. The achieved parameters are primarily dependent upon the level of domestic microelectronic circuits which form the principal share in the entire component base of the developed JSPST-N system.

SI-2000 Telephone Gear Described

24020017 Prague SDELOVACI TECHNIKA in Czech No 1, 1989 pp 25-26

[Article by Eng Jaroslav Slunecko: "Telephone Centrals of the SI-2000 System"]

[Text] At the Iskra Telematika Enterprise in Slovenia where telephone centrals have been in production since 1950, development of a fully electronic SI-2000 system was begun in 1980; the system, together with the 1240 system, was to comprise the production program for centrals through the year 2000. There is an entire series of Iskra enterprises and each one has its own special program. From the telecommunications standpoint, the enterprise which produces transmission equipment with a frequency division for 12, 24, ..., 10,800 channels and transmission system with a time division in the TDM-PCM mode for 30, 120, and 480 channels is the one which is important. Another Iskra enterprise is producing optical cables with attenuation better than 3 dB/km for λ = 850 nm with a band width of 700 MHz and cables with attenuation better than 1 dB/km for λ = 1,300 nm with a band width of 1 GHz. Regeneration of signals transmitted by light conductors is, thus, usable for 12 to 15 km in the case of λ = 850 nm and for 26 to 32 km for λ = 1,300 nm. The Iskra Delta Computers Enterprise is also participating in the production of telephone centrals.

The first item introduced into production was the private branch exchange Model SI-2000-020. A considerable quantity of these exchanges is already functioning successfully, both in Yugoslavia and also abroad. Furthermore, a new generation of digitalized exchanges of modular design was also developed. The basis for this design is a module which is controlled by a microcomputer. The SI-2000 exchange utilizes PCM digital communications equipment which presents the possibility for utilizing this equipment even in future networks. At the same time, this equipment is compatible with existing exchange systems. The conversion of analog voice signals to digital PCM signals fulfills the recommendations of the CCITT for time-divided multiplex 32-channel equipment. The program controls are divided into individual modules. Each module services a smaller number of subscribers, and the exchange as a whole is less sensitive to incidental defects.

The technical aspects of the exchanges utilize the most modern circuitry produced with HCMOS and VLSI technologies. The microcomputer is controlled by a Model M-6802 microprocessor. The memory capacities are 256 x 1 kB—DRAM and 32 kB—EPROM. The conversion of analog signals to digital PCM signals and vice versa is accomplished by a single COMBO jack. Similarly, the receivers of the frequency selector are located in a single jack. By using modern components, the consumption of energy and the requirements for space have been substantially reduced.

Use of the modular design, the basis for which is the functional module which takes care of telephone functions or control functions, makes it possible to use a random configuration for the exchange and to expand it to a maximum of 64 voice modules. The exchanges are designated models SI-2000/xyz, where x gives the region of utilization, y designates the type of central, and z the specific version of the central (currently, z = 4). The significance of the x, y index is given in Table 1.

The Significance of Interchangeable x, y Values in Designating the Exchange Equipment

x	Significance of Model Designation
0	Private branch exchange
1	Exchanges for special networks
2	Public exchanges
y	
1	Exchanges having one subscriber module
2	Exchanges having several subscriber modules
3	Exchanges having digital subscriber modules

Description of Individual Module Functions

Each module is controlled by its own microcomputer in its optimalized version. The Model M-6802 microprocessor is able to address only 64 kB of memory. That is why the microcomputer has an electronic switch and can address eight data bank memories. For the time being, some of these are not utilized.

The connection between two participants of the same module is accomplished in the analog mode through the use of the matrix switching field (analog multiplex). The field is created by CMOS matrices and has 32 vertical components. The number of horizontal components is greater, according to the type of exchange, and in accordance with the requirements of operations or of the subscriber. The vertical components are connected to PCM samplers which transmit the signal to the GSM switching module. Subscriber sets are connected to the horizontal components (eight per plate), as well as transmitters and signal receivers, transmitters of private branch exchanges and, possibly, connections to the work station of the operator. In the case of large private branch exchanges, it is advantageous to solve the question of transmitters which support cooperation with existing analog centrals with the aid of ANM analog communications links. Connections with digital exchanges ar taken care of by the DNM digital transmission module which has 32 transmission channels.

The GSM switching module handles connections with various subscriber ASM modules, or between a subscriber module and the ANM or DNM transmitter modules and, via these modules, to other exchanges. Communication is accomplished via a time switch. The switching module is the only device through which virtually all connections pass and must, thus, have considerable redundancy. Important components such as, for example, microcomputers, power sources, and pathways along which communication is actually accomplished, are, therefore, duplicated. The PCM code is 8 bits long, the time multiplex has 32 channels, of which 30 are voice channels. A special duplicated IPC reversing switch exists for purposes of accomplishing communications between the microcomputers of all attached modules. It is possible to attach 64 voice modules and several nonvoice modules to the switching module.

An administrative module with a teletype, a visual display, and a cassette tape unit makes it possible to start the exchange after it is connected or following a disruption (introductory program) and carries out all communications involving the exchange. It executes changes with respect to semipermanent data in the memory of the computer, writes out errors, and provides statistical data regarding the operation of the exchange, etc. It also includes a built-in modem. Programs and data are entered on a CIPHER 540 S cassette tape unit.

The cassette tape unit is also used by the CHM tariff model. Tariff pulses are first entered into the RAM memory of the subscriber module. In the event of a power failure, this memory has a reserve lithium power source with a life expectancy of 10 years. Later, tariff impulses are reentered into the current memory of the tariff module, and the tariff, together with the number of the calling subscriber is recorded on the cassette tape unit.

The SI-2000 exchange unit facilitates the connection of the Model X-25 switch, according to standards issued by the CCITT for the digital transmission of data packets. The switch can have up to 12 transmitters connected to it, the maximum velocity of transmission is 110 packets per second. Multil'ADs are packet-uniting units with 4 to 16 terminals per transmitter. In Yugoslavia, the JUPAK system corresponds to the PDN (Public Digital Network). The system is compatible with the future ISDN (Integrated Services Digital Network) system for the transmission of data from state and international information centers, for the transmission of texts, diagrams, illustrations, etc. For the time being, the portion having the X-25 is used only exceptionally. A block diagram for the exchange is given in Figure 2 below.

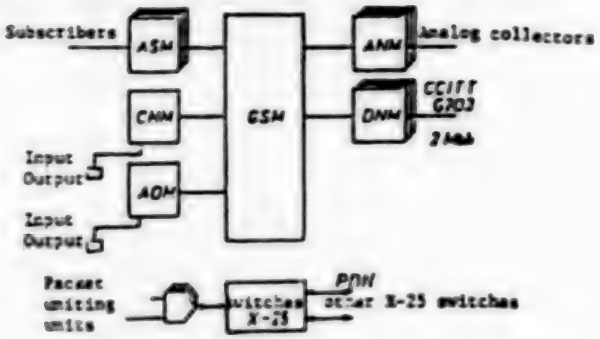

Figure 2. Block Diagram of the SI-2000 Central:

ADM	Administrative module
ANM	Analog circuit module
ASM	Subscriber module
CHM	Tariff module for digital circuits
GSM	Switching module
X-25	Switch

Assembly and Maintenance of the SI-2000 System

Assembly of the centrals is simple. The function modules have connectors on their backs into which functionally completed boards can be slid (slide-in units) and the tips of the individual connectors are connected with the rear panel by flat connectors. The individual modules are interconnected with standard cables. The modules of the central office are installed in cabinets measuring 1,900 x 700 x 450 mm. The room for centrals having several modules should be at at least 2,400 mm high, which is the current height of a regular room for living. The floor should have a minimum carrying capacity of 3,000 N/m^2. The temperature can range between 5 and 40° C, the relative humidity can range from 30 to 80 percent.

Small centrals having one subscriber module are produced in three sizes, depending on the number of subscribers. They are designated SI-2000/014, /214, or /114 and are housed in two, three, or four subframes. The main subframe houses the microprocessor with the appropriate interface, the multiplex, the subscriber sets, the transmitters, and signal equipment. Additional subframes are peripheral in nature and serve to increase the number of subscribers. The lower subframe holds the rectifier and the 48-V battery which is closed. The 48-V power source is used to provide any additional power for stabilized sources directly in subscriber modules. The central does not have any special climatic requirements and can operate, for example, in the reception office of a hotel or in an office of an enterprise. In the case of terminal centrals where operations are small-scale, it is possible to utilize dual connectors and to raise the number of subscribers up to 480.

The SI-2000/OMC (Operation Maintenance Center) was developed for maintaining and controlling a larger number of centrals from a single center; this device is generally located in the room having the largest central of a specific circuit. This likely also corresponds to the Czechoslovak Model MTO-B, -C, -D centrals. We attach the centrals to teletype units at the central office and any possible errors show up in the OMC printout. An alarm light appears on the cabinet in which the error has occurred, as well as inside on the slide-in unit of the defective module. Following the analysis of the error printout, a maintenance technician is dispatched to the central having a defect and carries with him the necessary slide-in unit. At the OMC, the computer is compatible with the IBM PC-AT. It is used to adjust all cassettes for tariffs to conform to the shape of the listed telephone numbers and the number of impulses during the month at the end of the month. The data are transmitted to the central office where invoices are written. Lower-level OMC units can be connected to higher-level SI-2000/OMC units.

Programming

Current connection between two subscribers can be augmented by the addition of other connections and the formation of conference connections involving as many as eight subscribers. The program records the number of subscriber stations participating in the conference call and equalizes the greater signal loss.

The program is divided into three main parts, as can clearly be seen from Figure 4. The operating system (SPO), the application program (APO), and the "on-line" diagnostic programs (TPO). The programs operate cyclically. The programs are activated every 10 ms on the level of an hour pulse. These are mainly programs to register changes in test points, that is to say, the picking up or laying down of the handset, changes in transmitters, etc. (scanning programs). These programs are followed by basic-level programs (base level) where the principal functions for accomplishing or breaking contact take place. On the same level, the "on-line" tests are carried out which control both instrumentation and also programming. Apart from these programs, there are programs for the thorough testing of the computer, of a module, or of the entire central. They are recorded on a

magnetic tape and are transcribed into the computer through the use of the administrative module. These tests are conducted during a time when the central is not in operation ("off-line"). They are used to test new centrals, to test centrals following assembly, and possibly even during maintenance operations when a complicated error has shown up.

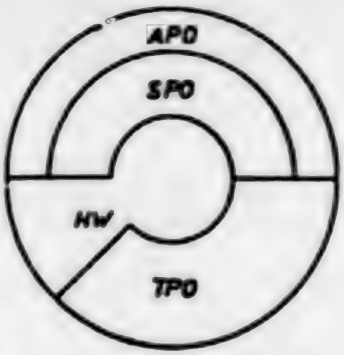

Figure 4. Depiction of Programming

APO	Application program
SPO	Operating system
TPO	Diagnostic programs
HW	Instrumentation program

The central office can fulfill various functions in conjunction with international standards. There are somewhat more than 100 functions and, therefore, I shall list only some of the most significant ones from the standpoint of private branch exchanges. Subscriber functions: change in the direction of the call, the subscriber is waiting for a connection to be made; a subscriber with a higher priority is waiting for a connection to be made; abbreviated dialing; abbreviated dialing in local operations; patching of public connection into the telephone of a "busy" subscriber. Restrictions: restriction of connections involving selected network groups; unauthorized connections; restrictions in local operations; restriction of automatic connections; restrictions for certain call directions; restriction of connections to the public network; "do not disturb"; "not present"; restriction of connections which have been called, etc.

Conclusion

The PCM electronic system used in the SI-2000 gear contains solutions for solving centrals from the smallest, having a single ASM module serving several tens or even hundreds of subscribers, through the largest system having 64 voice modules, that is to say, 10,000 subscribers with an appropriate number of transmitters. The centrals use the most modern components and meet all CCITT requirements. The solution is very flexible; a central can easily be expanded, a change in semipermanent data can be used to balance the load in the directions of call and can change the subscriber categories involved. Power consumption is small and requirements for space are minimal. It is possible to control and repair an entire series of centrals from the central SI-2000/OMC unit. After adding an X-25, switch we can operate with packet-uniting units.

HUNGARY

Hungary's Bloc Telephoto, Press Network Discussed

25020024 Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian 2 Nov 88 p 6

[Article by Huba Bruckner: "The Pictures of the Future"]

[Text] Between the Hungarian Telegraph Bureau [MTA] and its more than 70 partners, news exchange is continuous over 24 hours of the day. It is a global phenomenon that the traffic of news agencies, the amount of material received and transmitted doubles every 6 to 7 years. The growth in traffic requires the continuous renewal of communication methods and equipment.

In the early seventies the MTA initiated a modernization of the communication network among the socialist countries and took it upon itself to develop the necessary technical installations. As a result of this effort, a multiplex installation for the multi-channel transmission of news and pictures was created of which more than two hundred were installed in Europe and in countries on other continents.

In the international telephoto network of socialist countries, the products of the developmental effort carried out in the seventies under the direction of Gabor Budai—and also honored with the State Price—are still being used today.

After the establishment of the international network, and based on the favorable experiences, the domestic press and news network was built during the second half of the seventies. The solution, based on a basically analogous technique, has brought about a qualitative change in the information supply of the megyes' press.

Praise of the Digital

Sent via the global electronic picture transmission network, the pictures must arrive nearly simultaneously with the events at practically any point of the globe. In addition to the demand for speed, the demand for quantity also increased because more pictures are demanded not only by the print media but television also appeared as a new consumer. The transmission, editing and storage of traditional pictures on paper is becoming increasingly difficult in the age of the electronic press not even mentioning the rapid increase in costs.

Demands can be satisfied only by applying the digital technique. After all, photos described using digital signs can be processed, stored, electronically enlarged or reduced in size, retouched and provided with captions by means of a computer. At the reception site they can again be stored and a paper print will have to be made (if at all) only of those which will be actually needed in the publications.

Because of its geographic location and technical preparedness, the MTI is taking on an important role in the transmission of the news and picture material of global agencies. The introduction of digital technology in the telephoto service was justified by increased domestic demands, technological changes accompanying the electronization of editorial offices and also by the international connections.

Large-Scale Developments

Miklos Toldy, head of the Main Ofice of Development and Investment of the MTI, related that the introduction of digital facsimile transmission is considered part of a comprehensive developmental effort.

The construction in progress on the Nap Mountain in Buda can be seen from far away. The new service wing under construction provides a neat cover for the rather out of place "socialist-realist" building nearby. The microwave and satellite-receiving antennae will be placed on the top of the all-glass building.

The OMFB [National Technical Development Committee] is also contributing funds for the establishment of the national telephoto network. Its center will be in the MTI

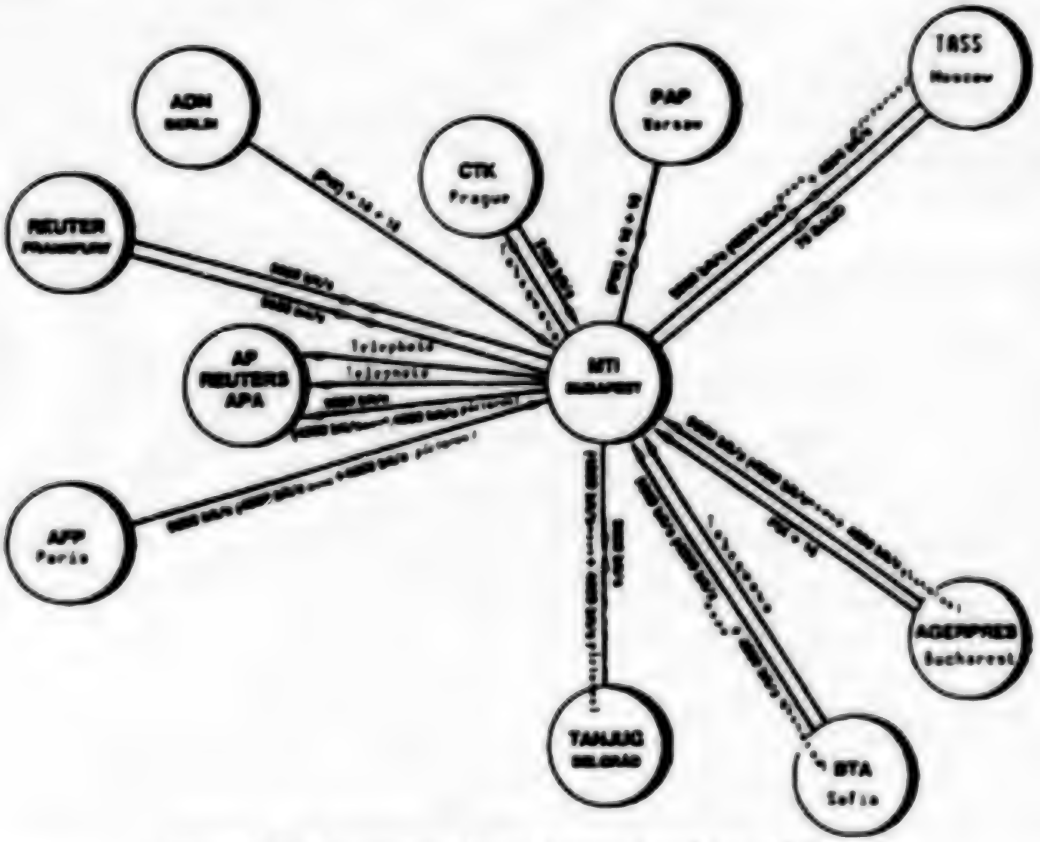

Figure 1. The International News Agency Connections of the MTI

In our country, the new technique was first applied for international picture transfer. Meanwhile, it became obvious that the domestic facsimile network is increasingly falling behind the requirements. The problem is further aggravated by the fact that the telephoto equipment purchased earlier is already unreliable and rather costly to run.

The situation is ripe for modernization of the network. The more so because the change in technology will thus coincide with the process of electronization of the press. building where the pictures will arrive from the foreign agencies and the MTI editorial offices in the provinces. The rate of transmission is 9600 or 14,00 bit/s, customary on international lines, but 16,800 bit/s will also become possible soon. Processing of the photos and the preparation of Hungarian language captions will be done at the picture-editing terminals and the pictures will be stored in the linked computer. The digital technique enables the amassing of a considerable amount of information but even

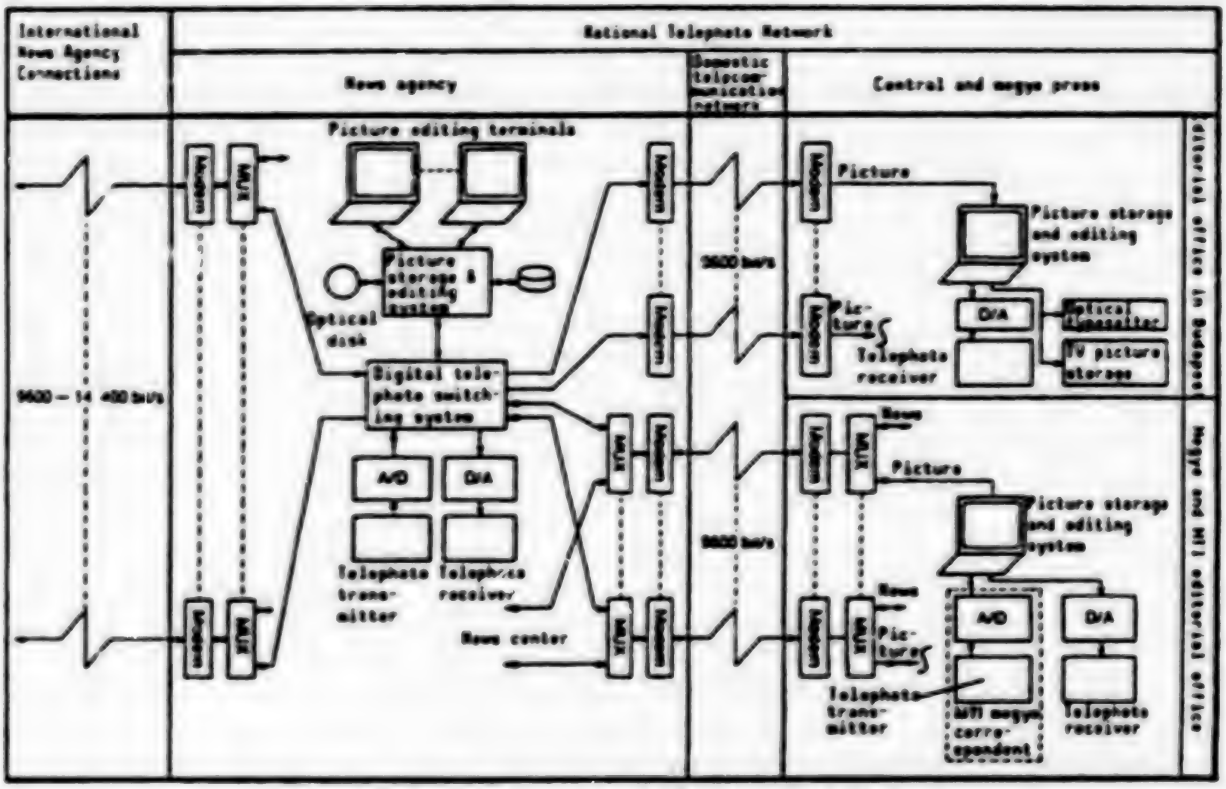

Figure 2. Systems Diagram of the National Telephoto Network

though, capacities on the order of megabites are needed for the storage of individual pictures.

The edited pictures are then forwarded to the editorial offices of the papers, compiled according to demand. Here, equipment of lesser capacity is also quite sufficient because only a few dozen pictures have to be stored and recalled each day. Therefore, while a disk storage capacity handling system, built around a mini computer with several hundred megabites, must be located in the center, equipment based on a personal computer will also suffice in the editorial offices.

The essence of the entire telephoto network is the digital switching system which can be likened to an intelligent, special purpose telephone center. It controls the quality of the incoming signal, corrects it within a given range, and forwards the data flow in the appropriate user directions. With the center, transmission paths can be built at will including the sending of the same signal to several "addresses" simultaneously. The latter must be used, for example, when the most important picture material is being sent simultaneously to several editorial offices.

On the Way

The essence of the telephoto system is already in operation, moreover, its expansion and the development of new functions go on continuously. In addition to picture processing, retouching and editing capabilities, the simultaneous production of as many as 16 pictures will be possible in the future, aiding rapid oversight and editing. Experience shows that electronic picture storage and recall represent considerable savings because no longer are there paper prints made automatically from the masses of photos received from the news agencies. This will be necessary only for photos selected by the picture editors in cases when some editorial office is not yet prepared to receive the electronically transmitted pictures.

The electronic storage of pictures makes it possible to recall them using data base techniques, that is, the needed pictures can be selected on the basis of a simultaneous fulfillment of several conditions. It is characteristic of the digital technique that the quality of the pictures does not deteriorate in the course of the various steps of manipulation, which would be unthinkable with the analogue technique.

When the network is fully completed, the picture material will be forwarded electronically to the central press and the megye editorial offices just as the photos will also arrive in the form of data signals from the megye seats to the MTI. According to plans, megye systems, which can be built around personal computers of lesser capacity, will be built with domestically developed components.

The experimental central switchboard for the digital telephoto system has been completed and is already in everyday use. The developmental engineers of MTI are

already working on the final version. Outstanding work is being done by the enthusiastic team; this is reflected also by the fact that Reuter, one of the world's largest news agencies, also indicated that it will purchase the center developed in Hungary.

Optical Archive

In addition to the introuuction of modern cameras that take pictures on magnetic disks and electronic picture transmission, the modernization of picture storage also fits into the broad developmental plans of the MTI.

The news agency owns perhaps the largest picture archive of the country. Today, the mass of pictures numbering several millions is kept on microfilm. Probably not for long. It is their firm intention to put everything possible, primarily telephoto pictures, into optical storage in the future. Of course such a significant change in technology is only possible after a thorough preparation and in the possession of adequate money. If nothing else, the lack of money will certainly delay the change over. This hurts only partly in the age of the rapid development of optical storage because of the appearance of ever improved systems. However, with passing time, the stock to be stored is further increased and, therefore, the change-over cannot be delayed much longer.

Fortunately, there is already ample experience with applications because many of the world's large news bureaus and publishers are storing their picture material on gigabite disks sparkling in the colors of the rainbow.

BAHRAIN

Telephone Agreement Signed With Kuwait

55004514 Muscat TIMES OF OMAN in English 2 Mar 89 p 17

[Text] An agreement between the Bahrain Telecommunications Company (Batelco) and the Mobile Telephone Systems Company (MTSC) of Kuwait allowing the mobile telephone subscribers of both companies to use the domestic facilities in Bahrain and Kuwait while travelling within the other country's territories, was signed recently.

The agreement was signed by Brian Wood, Batelco's general manager, and 'Abdallah al-Sabij, chairman of MTSC, in the presence of a number of senior officials from both companies.

According to the terms of the agreement, customers wishing to use this "roaming" facility, may apply to their home administration at least two days prior to the start date in which the service is required. A BD4 per month, or part thereof, will be charged to provide this service.

"Call will be charged at the same rates of the countries from which calls are generated," a Batelco's spokesman said. He explained that if a customer, for example made a call to a telephone number in Kuwait, while in Kuwait, then he will be charged at the rate levied by MTSC for domestic calls. Similarly, if the same customer wished to call a Bahrain number he will be charged for an international call from Kuwait to Bahrain at the same MTSC rate.

BANGLADESH

New Satellite Ground Station Planned for Dhaka

55500053 Dhaka THE BANGLADESH OBSERVER in English 30 Jan 89 p 3

[Text] Arrangements are being made to set up an 'A' type satellite ground station at Mahakhali in Dhaka to keep informity with worldwide developed satellite system, reports BSS.

Setting up of the satellite station at Mahakhali was necessitated following advancement of digital technology, according to a T and T Board Press release on Sunday.

Another microwave tower will be installed at Mahakhali following the decision taken to change the microwave link from Dhaka to Sylhet, Mymensingh and Bogra. The present two towers located at Maghbazar and Ramna cannot be used for technical reasons, the Press release said.

Planned UHF Radio Link Not To Cover Several Areas

55500052 Dhaka THE NEW NATION in English 12 Feb 89 pp 1, 8

[Text] The government has undertaken a project for establishing ultra high frequency (UHF) telecommunications (radio link) with the 396 upazilas and 15 other important places of the country at a cost of Tk 50 crore with the help of the Finnish government.

The project has been undertaken mainly to establish modern radio link with the upazilas, specially with the disaster-prone zones of the country. The first phase of the project has already been inaugurated by the State Minister for Post and Telecommunication at Tangail recently.

But almost all the disaster-prone areas including the coastal belt of the country have not been included in the programme. The vulnerable zones which have been excluded from the programme belong to greater Faridpur, Chittagong and Comilla districts.

The official sources, however, could not assign any reason why these important districts had been excluded from the radio link programme.

The work on establishing radio link with 30 upazilas has already been completed, according to official sources.

Project To Expand Microwave System Funded

55500051 Dhaka THE NEW NATION in English 8 Feb 89 pp 1, 8

[Text] The Executive Committee of the National Economic Council (ECNEC) approved one project with an investment expenditure of Tk 80 crore 45 lakh including a foreign exchange component of over Tk 52 crore, says an official handout.

The approval was given at a meeting of the ECNEC held yesterday at the conference room of the Jatiya Sangsad Bhaban with Prime Minister Mr. Moudud Ahmed in the chair.

Agriculture Minister Major General (retd) Mahmudul Hasan, Shipping Minister M Korban Ali, Jute Minister A K M Moyeedul Islam, Planning Minister Air Vice Marshal (retd) A K Khondaker, Fisheries & Livestock Minister Sardar Amzad Hussain, Finance Minister Dr. Wahidul Haq, State Minister for Youth and Sports Lt. Col (retd) H.M.A. Gaffar, State Minister for Posts and Telecommunications Qazi Firoz Rashid and senior officials of concerned Ministries, Divisions and the Planning Commission were present in the meeting.

The approved Project 'Expansion of Microwave System in Bangladesh (Revised)' is being implemented by T & T Board throughout Dhaka-Chittagong, Dhaka-Khulna and Magura-Kushtia Microwave links.

The objective of the project is to replace the existing old unserviceable radio equipment which have already expired their effective life and to modernise the transmission system to meet the increased demand of channels. The work on Dhaka-Chittagong link has already been completed while the work on Dhaka-Khulna and Magura-Kushtia link is expected to be completed by June, 1990.

The ECNEC also considered the annual audit and financial report for 1987-88 of the Bangladesh Bank. During that year, the Bangladesh Bank earned a profit of over Tk. 464 crore which is more than Tk. 29 crore over the previous year.

INDIA

Satellite-Based Data Network Ready by October

55500059 Madras THE HINDU in English 23 Feb 89 p 2

[Text] Madras, 22 Feb—The satellite-based data switching network set up by the Department of Telecommunications (DoT) would become operational by October, Mr P.A. Mohammed Yaseen, General Manager (Data Networks) of the DoT, said here on Wednesday.

Addressing the Southern India Chamber of Commerce and Industry, he said the network provided instant communication of data to any remote corner in the country with the help of computer terminals. Now data transmission was being provided to subscribers on leased local/long distance lines through the Public Switched Telephone Network (PSTN).

The remote area business message network consists of a master earth station and a packet switch located near Delhi which is the hub of the system, and a number of micro earth stations in star configuration. The micro earth stations communicate to the master station through the INSAT 1-C satellite system and customers could connect their data terminals or computers to the micro stations for onward transmission of data.

Linking Remote Corners

Describing it as a marriage between computers and communications, Mr Yaseen said the micro stations, also known as VSAT, could be located at customers' premises in any remote corner. The network could replace downloading of files from computers using a modem (a device that converts digital signals from a computer into tone variations for transmission over standard telephone lines).

The interactive data could be transmitted at a speed of 1,200 Bps (bits per second) which was faster than data transmitted through telex or fax, he said.

The network also provided access to international data networks in any part of the world through the Gateway switch of the Videsh Sanchar Nigam of Bombay.

Mr Yaseen said that under the packet switched public data network known as Vikram, the DoT planned to install switching exchanges in eight major cities, and 12 exchanges in remote areas, and the network would provide interactive communication at various speeds. The system would be useful for telematic services such as Videotex, teletext and electronic mail (E-Mail).

The services would be useful for banking operations, railways, airlines, stock exchanges, hotels and tourism industry, civil aviation and mining industry. Already, 275 organisations such as ONGC [Oil and Natural Gas Commission], BHEL [Bharat Heavy Electricals, Ltd.], including 10 from Madras, had pre-registered for getting the network installed. Considered to be unique of its kind in the country, the network could even dispense with the courier service in view of its speed, and the tariff depended on the traffic and not on the distance, he said.

Secrecy Provided

Subscribers would be functioning as a Closed User Group (CUG) with absolute secrecy of their files and data, and provision had been made also to download data on a collect call basis. There would be provision to connect 16 terminals with the network and data could be transmitted simultaneously from all the terminals. The charges for data transmission would be displayed at the end of the call.

The non-voice communication network promised error-free performance and interference immunity besides instant data communication. It cost Rs 4 lakhs, Mr Yaseen said.

Mr K.K. Ramaswamy, Chief General Manager, Madras Telephones, said the network would have access throughout the world at the touch of a button and would be a boon to industrialists especially with worldwide operations.

Mr M.A. Alagappan, Chamber president, welcoming the gathering, said the cost could be reduced to provide accessibility to medium-scale industries.

Writer Discusses Demand for Satellite Services

55500061 Madras THE HINDU SURVEY OF INDIAN INDUSTRY in English 1988 pp 139, 143

[Article by K. Venugopal]

[Text] It is with some nervous anticipation that the Indian Space Research Organisation (ISRO) and the Department of Telecommunications are looking ahead to the launch of INSAT I-D, the fourth and last in the INSAT I series of domestic communication satellites.

The nervousness is understandable. Only one of the three satellites that have gone up so far can be termed a success: INSAT I-B. The first of these, INSAT I-A was a case of neo-natal mortality, lasting for just five months after its launch in 1982. The next year, INSAT I-B, blasted off into space aboard the United States space shuttle, and after surviving some early problems, has operated with unqualified success for over five years now.

Satellite lifespans, restricted by the volume of fuel that can be carried on board, are relatively short; and INSAT I-B's lifespan is expected to run out by September 1989.

There was considerable expectation and hope when INSAT I-C was hoisted by the European Ariane rocket into geostationary orbit in July 1988 from the rain drenched French Guianese town of Kourou. The launch was near perfect, indeed far too good to be true, as it turned out. A short circuit in satellite's electrical system soon after it got to its geostationary slot above the Indian Ocean cut power supply to six of the 12 transponders, leaving it just half a satellite.

The planners, in going in for a series of four satellites, had bargained to have at least two in working order at any given time. Even if five years ago there was not enough demand for satellite services to keep two of these birds busy, the demand is evident today. INSAT I-C was fully booked even before it went aloft. Now that its capacity has been halved, the DOT has to make do with one and a half satellites, and if even this status ought to be maintained into the 1990s, INSAT I-D needs to be an effective replacement for the aged INSAT I-B.

It was always apparent that satellite based telecommunication services would be increasingly required. The terrestrial communication network may have served the towns to a reasonable extent, but it tended to bypass the rural areas. The reach of the satellite-based services on the other hand is total and there is enough evidence to show that the country has benefited immeasurably by it.

There can be no better example of this than the swift expansion of the television network. Prior to 1983, television reached just 28 percent of the population, served chiefly by transmitters at the four metropolitan cities, which were linked by microwave. Today over 250 transmitters relay programmes from Doordarshan's studios in New Delhi, bounced off a powerful S-band transponder on INSAT I-B. Over 70 percent of the population can now tune in, a rate of expansion that might have been hardly possible if terrestrial links had to be laid. Regional television services to Maharashtra and to Andhra Pradesh, operating on a half transponder mode in the C-band, deliver programmes produced in Bombay and Hyderabad respectively. The satellite is most efficient when a common programme is beamed to the entire country. Yet, with the preference for programmes in the local language being expressed quite vociferously, more regional services are being provided. Last year, in response to public demand, low power transmitters in Tamil Nadu that were beaming network programmes from New Delhi, gained access to Tamil programmes from Madras through the second S-band transponder. And INSAT I-C is expected to beam regional services to Karnataka and Orissa.

Yet the major part of satellite capacity has gone to the aid of the telephone service. The induction of satellite two way voice circuits has resulted in a vast improvement in the quality and reliability of communication between the major cities, and with digital trunk automatic exchanges being established in the important towns and the extension of satellite circuits to them, the national subscriber trunk dialing service has widened its horizon. Subscribers in Tiruchirappalli, for instance, can dial a friend in Shillong without much difficulty.

Quite in the same fashion, tremendous opportunities have been opened up for data links across the country. For the benefit of Government departments, the National Informatics Centre's NICNET is a nationwide satellite-based two way data communication network that links district headquarters, State capitals and Central Government departments, each served by a micro earth station equipped with a 1.8 metre diameter parabolic antenna.

For the remote northeastern regions, some 50 small aperture terminals provide access to the satellite for the rural telegraphy network.

What is bound to be of interest to industrial units located in the rural areas with "fair weather" communication links with the rest of the world is the proposed Remote Area Message Business Network (RAMBN). For many years now, large industrial units pushed out of the major towns and into the wilderness of a backward district, have suffered the worst of the country's telecommunication network. When the RAMBN, which will use one of the transponders on INSAT I-C, is commissioned later this year, these units can at long last have a reliable communication facility. Up to 1,000 subscribers can join the network, which is expected to be linked with the proposed Vikram packet switched data network. However, the RAMBN has its imitations: It is purely a data network, which means that one cannot speak on the line; and the data transmission speed is restricted to 1,200 bits a second.

A number of captive or dedicated networks have already been set up using INSAT I-B: the ONGC, for instance, keeps in touch with its offshore platforms via satellite, while THE HINDU's New Delhi edition is composed of pages transmitted in facsimile from Madras through INSAT I-B. The number of private networks is slated to grow.

Meteorology has also been well served. INSAT I-B is providing several images daily of cloud patterns over the country, sea surface temperatures and other data that aid

forecasting. For the past three northeast monsoon seasons, a string of disaster warning system receivers have been operating along the coastal villages in Tamil Nadu and Andhra Pradesh. In the event of an approaching storm, these receivers broadcast warnings transmitted from the Madras weather observatory via satellite. It is another matter that since its commissioning, the system has crackled to life in only one of the three seasons: there were no cyclones in 1986 or 1988.

While for the Meteorological Department there may be little profit in getting the same data from two satellites, the availability of two satellites is imperative to meet the overall demand. That is why it is crucial that INSAT I-D succeeds.

Indigenous Technology Weighed Against Foreign

55500060 Calcutta THE TELEGRAPH in English
26 Feb 89 p 4

[Report by Sandhya Jain. Sam Pitroda, the Prime Minister's adviser on technology missions, is waging a bitter battle against multinationals which have an eye on the Indian telecommunications market.]

[Text] The stake is 20 billion dollars. Who will win the game? The Centre for the Development of Telematics (C-DoT) or multinationals who are desperate to make a dent in the Indian telecommunications market? The battle, which was joined four years ago, came into the open with the reported statement by Mr Satyen Gangadhar ("Sam") Pitroda, adviser to the Prime Minister on technology missions, that the Indian government was being pressurised to sign a deal with the French multinational CIT-Alcatel. The French President, Mr Francois Mitterrand, was quick to deny the charge during his visit for the inauguration of the Festival of France in India early this month.

The denial, however, lost much of its force as the French made no bones about the fact that they had indeed come to seek business. Subsequently, a press conference and exhibition on the latest developments in their communication technology, in which Alcatel maintained a high profile, was held in a five-star hotel in the capital.

Whether it is Alcatel or Ericssons of Sweden (who earlier tried to sell the cellular radio or "car phones" as they are popularly called), it is understandable that India should be the cynosure of the telecommunications giants—for it is going to be a sellers' market. With telecommunications reaching near saturation point in the developed countries, the word, naturally, is to "go East."

Alcatel has reportedly shown interest in setting up a second factory in collaboration with Indian Telephone Industries (ITI) at Rae Bareli in the politically important state of Uttar Pradesh. At the time of its joint venture with ITI in Mankapur in UP's Gonda district in 1983, it had also secured an "in principle" decision from the Cabinet that a second factory would be set up jointly with it at Bangalore.

Alcatel would now like to set up this factory in Rae Bareli since a decision has already been taken to have the second factory with C-DoT technology. The idea is to produce an advanced version of the E-10B. Alcatel is enticing the department of telecommunications (DOT) with an offer of the Integrated Services Digital Network (ISDN) which is the ultimate goal of India's telecommunication effort. ISDN is required for non-voice services like the telex, high speed data, fax and computer-to-computer services.

ISDN, if acquired, would be useful to government and business enterprises, but it is hardly a priority requirement at the moment. As a C-DoT official put it: "ISDN for us is India simply doesn't need it."

ITI is not enthusiastic about a collaboration with Alcatel as the Mankapur factory has not been a success (see box). But the proposal reportedly enjoys the support of the influential Hinduja family, who are believed to have been involved in the previous deal as well. The Hindujas have an old relationship with Alcatel of France and are said to have played a role in the merger of Alcatel with ITT of Belgium. When contacted by THE TELEGRAPH, Brig R. Mohan, president of Alcatel-India, said he could not comment without clearance from Paris as the issue was "very sensitive." Subsequently, he was unavailable.

Alcatel's proposed entry is being violently opposed by C-DoT over which the high priest of Indian indigenisation, Mr Sam Pitroda, presides. In an interview to THE TELEGRAPH, Mr Pitroda said: "According to me the liberalisation message has been misused, misinterpreted, partly by design...if you take this kind of liberalisation too far then I would say there is nothing that we should make in this country. Everything we make, somebody makes it better than we do, including furniture."

Mr Pitroda's critics have made much of the fact that C-DoT, which was set up in August 1984 with a mandate to produce a 16,000 Port Main Automatic Exchange (the local exchanges that subscribers are familiar with) with indigenous technology within 36 months, is considerably behind schedule. Conceding the delay, Mr Pitroda retorts, "What difference does it make in the history of a nation? If I say 36 months it hurts me if it is not 36 months. Let's say it's 46 months, it bothers me, but so what? I can't demoralise them." His "boys," he points out, work 16 hours a day.

Though no company in the world has produced an electronic digital switching system in less than six years and at the cost of several hundred million dollars, C-DoT can justifiably boast of doing it in equal, if not

less, time and at a fraction of the price. So far, it has received less than Rs 70 crores from the government, and its achievements are by no means insignificant.

Mr Pitroda points out that in the period during which C-DoT was supposed to deliver the MAX, it delivered an improved and totally indigenous PBX (the PBX 128 port), and a rural exchange (RAX 128 port) which were not part of its mandate. These do not require any air-conditioning, a feat that has not been achieved anywhere else in the world. C-DoT's 512 port exchange that constitutes the basic building block for the 16,000 port MAX needs some air-conditioning for two frames only and can tolerate air-conditioning breakdowns for two to four hours. In contrast, the French E-10B has a low tolerance to air-conditioning failure.

So far, over 500 units of the PBX 128 port have been sold in the market. The ITI has also produced RAXs for the RAX-a-day programme and 42 of these have been commissioned so far in the rural areas of Karnataka, Tamil Nadu, Maharashtra, Madhya Pradesh, Andhra Pradesh, Gujarat, Kerala, Uttar Pradesh and Jammu & Kashmir.

In the process, C-DoT has built up a large infrastructure of ancillary industries, in both the public and private sectors, to manufacture the base modules and printed circuit boards that form the building blocks of its exchanges. (Less than 20 percent of C-DoT's components are imported). These manufacturers have a vested interest in the indigenous technology and have joined C-DoT in its fight against the multinationals. Says C-DoT executive director G.B. Meemansi: "This is the last battle for self reliance." Mr Pitroda agrees, "The pressure is mounting high today because we are closer to success."

A senior C-DoT official said they had delayed the Main Exchange by design and delivered the PBX and RAX first to create a support base of ancillary industries. Otherwise, he confided, "It would have been difficult for us to survive. The import lobby is so strong."

In 1985, C-DoT was able to forestall the entry of multinationals by producing the PBX, for which a global tender had been floated. In fact, three concerns had been shortlisted for the transfer of technology to 10 state electronic corporations. However, supported by the department of electronics, C-DoT was given a chance to produce the PBX. It succeeded.

C-DoT's 512 port MAX (which gives about 400 working lines and is the base component for the 16,000 port MAX) has cleared the environmental tests and is expected to start production this year. This, an official said, is as good as starting production on the MAX as the difference in hardware is only about 10 per cent. If C-DoT had concentrated solely on the MAX, he said, "they would have imported another technology in the meantime."

That danger is not yet past. The "import lobby" enjoys powerful support from the department of telecommunications which has prepared a fairly convincing case. Their argument is as follows: the goal is to provide 1.9 crore telephones by the year 2000 for a population of one billion.

Officials of the department, who preferred to remain anonymous, claimed that the actual demand by this time would be for around 10 crore telephones. Thus, however successful and commendable the indigenous effort might be, it cannot possibly satisfy the country's growing needs. Hence, they argue, there is room for all. If this reasoning succeeds with the powers that be, the multinationals will have a field day. there is 20 million dollars to be made in switching systems (the main exchanges) alone. And thousands of jobs that could be created in the country every year will be lost.

The department of telecommunications is under tremendous pressure to deliver and its performance is judged only on the basis of the number of new connections provided. Neither the politician nor the common citizen really cares if the exchanges are "Made in France" or "Made in India"; they only want an instrument that works at a price that is affordable.

C-DoT is both nervous and irritated. On the one hand, it has scored a notable triumph with permission to set up the second factory at Bangalore with indigenous technology. On the other hand, a proposal is being mooted to have a third factory at Rae Bareli in collaboration wit the French. There is no logic in this, argues C-DoT. How can the government express confidence in us one day and lack of faith the very next day?

Alcatel, however, has powerful friends in the corridors of power. When it first came to India in 1983 it showed its clout by having a global tender for the fully electronic digital switching technology for telephone exchanges put in cold storage. Though Alcatel had not even submitted a bid, it walked away with a bilateral deal. Alcatel's wresting a similar concession during the course of this "fishing expedition" too, cannot be ruled out.

[Boxed Item]

Ringing in the Right Numbers

It is now widely accepted that the availability of telephones is intimately related to the economic and social development of a nation. In fact, there is a direct relationship between telephone density and the per capita gross domestic product (GDP). In other words, the rich nations have more telephones (nearly 80 per cent of the world's 50 crore telephones) while countries with an underdeveloped telecommunication network are invariably poor. More than 100 of the world's developing countries share less than four crore telephones.

In India there are only 35 lakh telephones for a population of over 80 crores. Of these, about 90 percent are in the urban areas. The waiting list, which is mainly urban, exceeds 10 lakhs. The whole country has only 36,000 public telephones.

The telephone density in India thus works out to over 100 people per 1000 lines as opposed to 30 in Brazil, 20 in Europe and 10 in the United States. Besides being woefully inadequate, the telephone services, once available, are inefficient and unreliable, largely because the network is old, over-used and the technology obsolete.

The Sarin Committee, which reviewed the performance of the telecom sector in 1981, recommended switching over to digital technology as it is more efficient and reliable and could help India make up for lost time. It is also nearly 50 percent cheaper than the existing technology. Following the Sarin Committee's report, the government entered into an agreement with CIT-Alcatel of France to set up a factory at Mankapur in Gonda district of Uttar Pradesh.

All telecommunications experts are unanimous that the factory has failed to deliver the goods and the agreement is faulty. The agreement provided for a transfer of technology, but the French system, E-10B, cannot be indigenously produced in India. Thus, as C-DoT officials maintain, there has been no transfer, but a technology "transplant." Ironically, this has in no way deterred the vociferous "import lobby" from pressing its case for another agreement with the same company.

The technology mission on telecommunications, set up in 1987, aimed at transforming the country's telecommunication landscape. It hopes to achieve a target of 1.9 crore telephone lines by the year 2000 (starting in 1988). At present estimates, the demand by then would be for five crore telephones.

At present, the annual growth rate of the telecommunications industry is around eight percent. This will have to be raised to nearly 12 percent to meet the target which means nearly 20 lakh new lines will have to be added every year. The total investment up to the year 2000 would be in the region of Rs 30,000 crores, that is about Rs 2,500 crores per annum. If such a growth rate is actually maintained, it could generate nearly 50,000 new jobs directly and another 50,000 indirectly in the manufacturing and ancillary industries. The "indigenisation lobby" is therefore using this argument to keep the multinationals at bay.

The task of the telecommunication mission is to build up a single national telecommunications network that can provide efficient, reliable service to the government, business, institutions and the common citizen in urban and rural areas. In fact, rural telecommunications have been earmarked for special attention: by 1995 at least one reliable public telephone and telex and one data terminal must be installed in each village.

Besides improving the telecommunication equipment, and providing satisfactory service, the mission aims at providing facilities for direct dialing to all the major cities and countries as well as new voice and data services all over the country.

IRAN

Telecommunication Network Expanded

55004706a Tehran KAYHAN INTERNATIONAL in English 6 Feb 89 p 6

[Text] Sanandaj, Kurdistan Prov., Feb. 5 (IRNA)—A one-day seminar on Satellite Communications was opened here Saturday by Minister of Post, Telephones and Telegraph Mohammad Qarazi.

The seminar is to discuss strides made in telecommunication technology around the globe, use of satellite in today's world as well as better exploitation of satellite facilities in the region and in Iran.

Qarazi addressing the seminar dismissed as 'baseless' the claims of Iran's enemies that no progress was made during the First Decade of the Victory of the Islamic Revolution.

"The fact is, only in the field of telecommunication, many remote villages were joined to the country's telecommunication network," said Qarazi. Cities and far-flung parts of the country now enjoy microwave systems and are linked to the international telecommunications network, which proves the claims of our distractors as "unfounded," he reasoned.

Qarazi laid stress on the need for providing telecommunication facilities to the whole country.

It should be pointed out here that Iran's satellite named 'Zohreh' (Venus) will be launched in 1991.

Optical Fiber Cables Plant Inaugurated

55004706b Tehran KAYHAN INTERNATIONAL in English 14 Feb 89 p 6

[Text] Yazd, Feb. 13 (IRNA)—Iran's first optical fiber cables plant was inaugurated by Minister of Post, Telegraph and Telephones (PTT) Mohammad Qarazi at the communication cables complex here Saturday.

The Rial five-billion ($71.4 million) plant produces 10,000 kms of fibers and 1,000 kms of optical fiber cables annually.

An official of the complex said here Saturday that an ambitious project is under way for annual production of three billion meters of copper cables, and that once completed it will meet the bulk of domestic requirements.

PAKISTAN

Badr Satellite Called World's Most Sophisticated

55004707a Islamabad THE MUSLIM in English 6 Mar 89 p 6

[Text] Karachi, Feb 25: Pakistan's first satellite Badr produced endogenously by scientists and engineers of Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) was more sophisticated than the first satellite launched by any country in the world so far.

The satellite is expected to be launched during this year or in early 1990 into a low circular earth orbit, aboard Ariance launch vehicle from Kourou, French Guiana. Initially, Badr was planned to be launched from NASA's STS as getaway special payload, but due to delay in the flight programme of STS, it is now expected to be launched in Piggi-back mode, aboard Ariance launch vehicle from Kourou, French Guiana.

Work on the satellite which has cost less than one million dollars began two and a half years ago, said Salim Mahmud, chairman Suparco, while addressing a Radio news conference in Karachi on Friday.

He expressed the confidence that the launch of the satellite would be successful and this would prove to the world that Pakistan was capable of making complex and sophisticated satellite without any imported component and also operate it successfully.

The satellite on which four successful tests have been carried out recently by scientists and engineers of Suparco would be a 26 facet polyhedron having a diameter of 483mm approximately and weighing about 65-70 kilograms, he added.

It would be put in a circular orbit at an altitude of about 600 kilometers and at an inclination of 95-98 degrees. The period of the satellite would be about 100 minutes and a typical pass over Pakistan would last for 15-20 minutes. It is expected that on average three to four passes of the satellite would be available in a day.

Mr Mahmud said the satellite will carry a digital communication experiment (DCE) the primary payload to be used for experimentation in digital store-and-forward communications among small low cost tracking ground stations in Pakistan. Two stations have already been established one each at Karachi and Lahore to receive message from this satellite. Two more stations are proposed to be set up one at Quetta and the other in Peshawar.

The Suparco chairman said the uplink of Badr will consist of a single channel in the U.H.F. frequency range and the downlink will consist of a single channel in the V.H.F. band.

He said the Satellite would be used in two modes of operations (1) DCE mode and (2) transponder mode. The DCE mode envisages experimental store-and-forward communications whereas the transponders mode shall be used for real-time voice communications the conditioned power available would be five watts.

Salim Mahmud said that the Pakistan National Communication Satellite project underway at Suparco proposes launching of two satellites one operating and the other in an orbit spare, to be positioned at 38 degrees east and 41 degrees east respectively in the Geo stationary orbit "we are determined to launch it from our own resources" he added.

He explained that the original cost of the project of nearly four hundred million dollars have been the main stumbling block in the full implementation of the project so far. Nevertheless the project has given impetus to the local development of microwave assemblies in Suparco for reception of TV signals directly to homes from the direct broadcast satellites.

Further work is also going on in Suparco to develop a single channel per carrier (SCPC) terminal specially for rural telephone with the help of satellites. Hired transponders on board Intelsat satellites would also be used for domestic TV and telephone communications. Previously Intelsat had only been used for international communications, he added.

He said the commission has requested the government to allow Suparco to sell the direct TV broadcast receiving stations in the country. He hoped some headway in this regard would be made this year, at present such stations have been given to certain institutions in the country.

Mr Mahmud said that the satellite ground station of Suparco at Islamabad now being run on trial basis would be fully operational next month. It can be described as one of the best in the world, according to the Suparco chairman.

About future projects of the commission, he said work was underway on setting up unattended platforms at Sea, river and snow to monitor tide, temperature and water current, in order to analyze all the information from these platforms, a station will be set up. Moreover a scheme is under consideration to install transponders in ships and aircraft which will help in providing them help in case of a distress call immediately. The commission was also carrying out research work to undertake scientific experiments at high altitudes in the country—PPI.

Booster Rocket Developed for Satellite Launcher

Work Based on Self-Reliance

BK2103143089 Hong Kong AFP in English 1354 GMT 21 Mar 89

[Text] Pakistan has manufactured a rocket booster as the first stage of a planned multi-stage launching system that will put a Pakistani satellite in a low earth orbit.

Selim Mehmud, chairman of the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) said here Monday that the booster had been designed and built by Pakistani scientists without any foreign assistance.

The official news agency APP said the booster would be test fired by mid-summer or early autumn. Its range is reported to be 400 miles (640 kilometres), similar to that of a rocket test-fired at a beach near Karachi in January.

SUPARCO had earlier announced that the first Pakistan-made satellite was ready for launching. Officials said that it would be put in orbit in collaboration with a Western nation in about a year.

APP quoting informed sources said that SUPARCO scientists were also working to manufacture the propellant fuel needed to power the satellite rocket booster. It said that SUPARCO was forging ahead with its space research programme on the basis of self-reliance, and the development of an independent multi-stage satellite launching system was a part of the programme.

Meanwhile, the mass circulation Urdu daily JANG reported Tuesday that Pakistan has developed a surface-to-air missile with a range of up to eight kilometres (five miles). There was no official confirmation of the report.

Manufacturing Program Continues

BK2103052689 Islamabad Domestic Service in Urdu0200 GMT 21 Mar 89

[Text] Pakistan has manufactured several types of rockets which can carry scientific equipment to considerable altitudes. The SUPARCO chairman has said in Islamabad that the rocket manufacturing program continues and a powerful booster will be tested this year for launching heavy scientific equipment into upper space. The objective of the program is not only to conduct experiments in space but also to launch light satellites into suborbital flights.

Commentary Calls for Deregulation of Communications

55004707b Karachi DAWN in English 10 Mar 89 pp 1, 4

[Article by Moin Ansari]

[Text] The days of controlled media are over. This is an age of deregulation and freedom. Our nation suffers from too much government. Laissez faire capitalism teaches us the advantages of less government. Our governmental leaders have much more important things to do than to control the content of TV and Radio.

The breakup of the NPT should be a beginning, not an end. All communications should be free, and privatized, so that the latest in technology can be given to the Pakistani population. Governments have neither the capacity, nor the capability to inundate our young minds with information. That task has to be left to the best minds of our country.

The government controlled TV and Radio are too clogged, too busy and completely caught up in a web of government red tape to allow freer communications. The printed media is the only channel available for our teachers and our mind-architects. Because of the large percentage of illiteracy in our country, the printed media has only a limited audience.

There is a revolution brewing in the information world of today. Pakistanis need to gear up for the next century. If we are left behind, generations will suffer. With the availability of computer technology over the phone lines, with the link-up of TV and computers, with the advent of High Definition Television (HDTV), with fax networks linked with telephones and computers, with a thousand other developments, the government cannot keep up with science and consumer demand.

One way of keeping out Indian waves is through jamming. Jamming reeks of defeat and closed societies. As Pakistanis we should take the challenge as a test of wills. May the better man win. Another way to fight the cultural invasion is by improving our systems so much that Indian are unable to compete. I espouse the latter.

The solution of media crisis in Pakistan is deregulation of the broadcast industry. Privately owned Pakistani Radio and TV stations should be allowed to flourish within Pakistan. Let us bombard our neighbors with many channels. All free democracies of the world have free and commercial television and radio. Let Pakistani Television and Radio mature, and prosper.

The entire world listens to stereo quality frequency modulated (FM) sound on their radios. Radio Pakistan has one or two FM stations in Islamabad but has no plans or will to introduce the popular FM system for our people.

Radio Pakistan has failed to educated our people. The same old mixture of "a lot of talk and little music", over and over and over again. No innovative programming. No darling journalism. No foreign coverage. No news-breaking interviews. No listener call-in, talk shows where one can ask questions from experts. Only rhetorical lists of listeners who get excited by hearing their names on radio.

Radio can be replete with news coverage, with amateur and/or student journalists from the world over. Radio can educate an illiterate population. It can warn of disasters. Radio should and must have emergency broadcasting news channels, weather coverage, etc.

In an agricultural country a farmer's livelihood cannot be left to the whims of meteorologists. Radio should and must have an exclusive channel for farmers, linked with telephone where listeners can call in and ask questions. It is strange that Radio Pakistan is content with archaic MW and SW technology, one station per city, all stations producing identical shows.

Air

Huddled in poverty, many, in our villages listen to the radio as their only contact with the outside world. Privately owned small FM radio stations could provide better sounding entertainment and news. FM has only a small radius of broadcast; sound quality in exchange of distance. All Indian Radio would be unable to reach most of Pakistan on FM even if they converted All Indian Radio to FM. Most listeners would prefer the sound quality of Pakistani FM to the instant and crackling sounds of MW or SW All India Radio.

Doordarshan

While PTV has been congratulating itself in lavish awards ceremonies, Doordarshan is educating the Indian population. Bangladesh has three TV channels. We can have more, without expense to the public. Let the private entrepreneurs try and let the artists be businessmen. Pakistani ingenuity maybe allowed work.

With privately-run TV and radio stations, the airwaves of the Indian cultural invasion will get lost in the proliferation of patriotic one of the two sources of information.

Like public-owned industry, public owned broadcasting has failed us. Government-owned TV and Radio stations can only get better if faced with competition from privately owned, local or national TV and radio stations.

There should be a lot more of daytime programming for housewives, farmers and students. Do the PTV executives ever read the published education policies of our governments. many of the plans can be implemented without additional expenses. PTV's international hookups must be used for purposes other than hockey matches. Live interviews with world leaders are unheard of on PTV. International tele-conferences with the Soviets and Indians can provide stimulating programming. The passive PTV needs fresh blood and new ideas.

With guaranteed license fees from consumers, PTV should have scientific feedback from the audience, to find what the audience want, instead of bowing to pressure from the clergy.

PTV should allow local contractors to legally sell PTV programmes within and outside Pakistan. PTV is loosing millions of rupees by not tapping this important source of revenue. At present all PTV plays are poor reproductions of boot-legged copies taped illegally.

Pakistani television can also beam broadcast to expatriates in the Gulf. Perhaps PTV can transmit or retransmit from ships. The entire world is hooked up to the Cable News Network (CNN) in America. The CNN is a TV channel devoted exclusively to news, 24 hours a day. All major TV networks in the world send CNN news roundup every Sunday. PTV is too busy to send news clips to foreign news stations in the US, Canada and Europe. PTV used old free news clip given to PTV. However PTV does not supply free clips to foreign news stations. PTV should send weekly news roundups about Pakistan to major networks around the world. Within time PTV news could earn credibility. PTV can send PTV local news to oversees Pakistanis and to Pakistani embassies.

PTV pockets license fees from people that cannot understand English but PTV does not provide the general Pakistani population, dubbing or subtitles. Most Pakistanis cannot understand English broadcast programmes. Why does PTV not broadcast in Swaheli or Portuguese? For the 'kisans' of Punjab all foreign languages are born equal, they cannot understand either English or Spanish.

Iranian and Arab stations dub foreign programmes so that the entire country can understand what is going on. Other foreign programmes, French, Russian, German, Japanese can be broadcast on PTV if PTV added subtitles, or dubbed the foreign shows. PTV has been poor in schools and audience participation and local programming.

New Technologies

Healthy competition can invigorate PTV. Other alternate TV channels can keep the nation away from thoughts of poverty and politics. A well entertained nation is a well satisfied nation. Religious people can be satisfied by giving them a channel devoted exclusively to the clergy. Within a few years, Pakistan can have privately owned, individual TV channels devoted wholly to sports, religion, local cultures, entertainment and news, and perhaps others.

Japan, the U.S. and Europe are fighting for leadership in new television technology called HDTV. High Definition Television will make existing TV sets and TV stations obsolete. HDTV is more clearer than the picture quality of slides. Let the Pakistani businessmen seduce the multinational conglomerates into investing in Pakistan.

The government can allow cable television, so popular in the West. Cable technology is not limited to entertainment. It will become the life line to computers. Cable TV allows better reception, and can provide better access to schools, banks, weather-services, emergency services and other informational activities.

Satellite technology will allow direct TV reception from the satellite to the TV set. Government control over TV is coming to an and anyway. It is better for Pakistanis to be able to watch other Pakistani TV channels then to watch other foreign channels.

Phones

Radio and television are not the only means of communication. Private phone companies can improve the availability of phones. The British example is in front of us. The government owned English phone company was like ours, incompetent and archaic. It took years to get a telephone in England. Shares of the company were sold to the public. The phone company was privatized. Today it is one of the success stories of Europe. Telephone availability has been reduced to witnin 14 days. We can do the same in Pakistan. "We have the technology". Private companies will automatically sanitize the organization of bribe taking clerks.

The miracle of economics and profit and loss does wonders to the efficiency of workers. The world is converting regular phone lines to fiber optic networks. We are still struggling with customers orders. The research and development cell in our national phone company is nonexistent. Why improve service, when there is no competition?

Telephone is the backbone of the communication industry and TV is but pivotal in shaping the economy of the future. Telephones are now being used to transfer voice as well as images. The entire Western world is totally dependent on fax technology to transfer photocopies of letters across continents. The new picture telephone transfers still pictures over existing lines and is now selling for about $400. In the U.S. telephone lines will be used as cable lines for television. Already the telephone lines are lifelines for computer modems. Not only do we need most Pakistani homes connected to the rest of the world, we need better phone lines. We need fiber optic networks.

The government has neither the time nor the resources available to try our new ways to use TV. Leave that to the Saigols, and the Seth Abids. These folks have the fortitude and the experience to experiment and to succeed.

OMAN

New Satellite Station To Be Established

55004518 Dubbay AL-BAYAN in Arabic10 Jan 89 p 13

[Text] Nur Ibn Muhammad Ibn-'Abd-al-Rahman, chief executive of the General Telecommunications Corporation, stated that the communications sector in the Sultanate will witness this year outstanding accomplishments in different regions, with 26 million Omani riyals [OR] being allocated to implement a number of vital projects.

In an interview with the 'UMAN daily published yesterday he said, "The organization is in the process of building a new satellite station in the Governorate of Nizwa to operate with the Atlantic Ocean-based satellite to facilitate communications and to reduce the pressure on the satellite station at al-Hajir."

Nur Ibn-Muhammad Ibn-'Abd-al-Rahman added that the General Telecommunications Corporation is presently conducting a study to reduce the cost of international telephone calls between the Sultanate and some of the friendly sister states at specified times. He indicated that he had discussed this matter with officials during his visits to some of the countries including the Arab Republic of Egypt which he visited recently and where he discussed the possibility of increasing the number of telephone lines between the two countries and reducing the regulated rates for communication between them.

He indicated that standardization of calling cards used in the Sultanate was aimed at easing communication from any place in the Sultanate which has a calling card phone for those wanting to make calls.

He went on to say, "The calling card phone services will cover all regions in the Sultanate this year with Omani technicians in the corporation currently installing these phones in many regions."

CYPRUS

BRT Receiving Satellite CNN Broadcasts

Satellite System Upgrade

NC3101144089 Nicosia YENI DUZEN in Turkish 25 Jan 89 pp 7, 8

[Article: "BRT Achieved What TRT and Greek-Cypriot Television Could Not!... Broadcasts from America Through Satellite"—YENI DUZEN headline]

[Text] Last Friday night those watching BRT [Bayrak Radio and Television] were amazed; the inauguration ceremony of the new President of the United States, Bush, was being broadcast directly from America. Neither TRT [Turkish Radio and Television] nor Greek-Cypriot television had been able to do such a thing, yet BRT succeeded.

Our investigation of the issue revealed that by using a satellite antenna, BRT was getting direct broadcasts from the American CNN (Cable News Network).

The BRT officials in charge said: "Though there are small satellite antennas on the market, the one we possess is a professional satellite receiver. We are working to upgrade our satellite system. At present, we are able to pick up 5-6 stations from Germany. We will install satellite receivers at the headquarters for upgrades. It is not possible to receive through satellite receivers on the market the broadcasts that we receive."

The first thing that comes to mind is the extreme primitiveness of BRT's programming despite such extensive possibilities at its disposal. The next question that comes to mind is the sort of problems that might emerge in the future because of all illegal reception of satellite broadcasts; this is because such broadcasts are regulated by various international laws.

The circles directly involved with the issue say that the existing international broadcast copyright rights have not "undergone the erosion of time" and that such rights are valid even if a century goes by. Therefore in the future, the Turkish-Cypriot officials "might find tnemselves in trouble" over this issue.

Concern Expressed

NC3101142089 Nicosia O FILELEVTHEROS in Greek 31 Jan 89 p 7

[Article by former Cyprus Broadcasting Corporation department chief Andreas Kiriakou]

[Excerpts] The recent relay by the clandestine station Bayrak of programs by the U.S. television network CNN should cause serious concern to all. The first relay took place on the day of the inauguration of George Bush, the new U.S. President, as CNN was broadcasting a live description of the ceremony. The second took place on Sunday when, until 1900 local time, Bayrak used its transmitters to relay CNN, which is considered one of the best U.S. television news stations.

With the installations at its disposal, Bayrak is in a position to broadcast the programs of other stations which relay their programs by satellite. This means that, in addition to the three Turkish channels, Cyprus will watch any other foreign station Bayrak may choose. It is very easy for one to see the huge dangers facing Cyprus television and by extension, all Cypriot people.

Unfortunately, the problems of the electronic mass communication media and especially the problem of cross border television, have never been seriously studied in this country. [passage omitted]

The government does not seem to be seriously concerned by this issue, which is directly linked with our national issue and especially with our survival as Greeks. [passage omitted]

Currently the primary issue is Bayrak's relay of various satellite television programs. We all know that no demarche has been made for this flagrant violation of Cyprus's sovereignty. If a Turkish plane were to fly over occupied Cyprus, a demarche would certainly be made along with a protest to the United Nations. However no protest is made for the flagrant violation of the airwaves under the sovereignty of the Republic of Cyprus. Furthermore there is the issue of the stations that broadcast the programs. Can any U.S. television channel use pirate stations in any country to relay its programs?

These are the primary issues that should be dealt with without delay. [passage omitted]

Developments in the field of satellite television are so rapid that every moment existing facts are being superseded. A delay in grappling with the problem will in any case render it more critical than it is today.

DENMARK

New Modem Allows Voice and Data Transmission on Same Line

55002454 Copenhagen BERLINGSKE TIDENDE in Danish 14 Mar 89 Sect 2 p 11

[Article by Henrik Damm]

[Text] A new modem makes it possible to transmit both voice and data via existing telephone lines.

Even though the number of KTAS [Copenhagen Telephone Company] customers wanting a permanently connected line for data transmission is showing a strong increase, KTAS will avoid having to lay more cables or replace old ones.

This is because the Soren T. Lyngso electronics firm in Horsholm had developed a special unit, an outband modem, which makes it possible to attain a very high speed (19.5 Kbit per second) for transmissions.

KTAS has provisionally awarded an order worth tens of millions of kroner for these modems, which will be located in customers' offices or homes and at the nearest telephone switching office.

Export

The advantage of the new modem is that it permits the carrying of both voice and data simultaneously on existing telephone lines so that the capacity of the lines is fully utilized, stated Soren T. Lyngso's sales director, Knud Kruse. The system was developed according to international standards, and may become an important export item for the Horsholm company.

ITALY

Eutelsat, Aerospatiale Sign Contract for Satellites

MI890126 Rome AIR PRESS in Italian
25 Jan 89 p 152

[Text] Eutelsat, the European organization for satellite telecommunications, has signed a contract with Aerospatiale for the prompt delivery of four medium-capacity Eutelsat 2 satellites. The contract stipulates that a network of four Eutelsat 2 satellites are to be installed before the end of 1991, in addition to the two Eutelsat 1 satellites which will still be operating at that time. The first Eutelsat 2 satellite will be supplied by the end of the year and launched in the spring of 1990. The other launches will follow at 6-month intervals to supply 64 50-watt relay stations designed to transmit television broadcasts all over Europe. Next February Eutelsat is also expected to place an order for a 5th Eutelsat 2 satellite, to be operational by mid-1992 and which will benefit from the same prompt-delivery terms by Aerospatiale. Eutelsat is a body composed of 26 European countries and is currently using four telecommunications satellites.

Cellular Phones To Be Available in 1990

55002447 Milan MONDO ECONOMICO in Italian
21 Jan 89 pp 70-74

[Article by Frederico Rendina: "The Telephone Takes Off"]

[Text] Cordless telephones will be available by 1990. Personal telephones in automobiles will sharpen the debate over the sector's realignment. Data, forecasts, and opportunities are given for the coming boom in the Italian cellular-telephone market.

We'll cut the wires and start shouting. And we may do so by telephone from home or car, even on the street or in court. For the 1990 World Cup in soccer, the SIP [Italian Telephone Co.] has already hazarded an important promise: personal telephone service to automobiles. The phones would be portable, weigh about as much as a couple of chili peppers, and be just a little larger than a cordless house phone. SIP promises that we will be able to buy them for not more than 1.5 million lire or rent them for the period necessary (by the week or month) as is done in America or in nearer England.

This, then, is how the mode, the market (and, therefore, the business) of portable widely broadcasting cellular radiotelephones will explode in this country.

Why "cellular"? Because the telephone traffic will take place (as it did recently with the latest generation of automobile radios) in a territory divided into "cells." There will be a computer system that will "displace" communication to the nearest repeater, "pass" the connection on to the nearest one when we move, track our location, and automatically recognize our identification code when someone calls. The cellular phone will thus be equipped with the same automatic characteristics as the home phone. Low transmission power will make it possible for cellular technology to use the same frequency for many remote callers separated by only a few kilometers, thus multiplying the radio channels available and serving hundreds of thousands of telephones on the same frequency.

The telephone will be portable, especially since these days the nebulous offices of ministerial bureaucracy have reached new heights in foot-dragging when it comes to the slow, tortuous liberalization of telecommunications services. Hence the possibility of disconnecting the radiotelephone from the automobile.

The cellular phone is a widespread phenomenon because its advantages should be accompanied by a gradual lowering of service costs, which will make it affordable to a much larger group of users than at present. All this prepares for a new leap forward, which should integrate the system into the European Community's in 1993.

A decidedly interesting scenario is developing for the citizen and the businessman because of the real possibility of tying in a whole series of innovative services to the new means of communication. But it is especially interesting because of the inevitable accelerator affect it will have on the debate concerning the regulatory realignment of this country's telecommunication services. To what extent is it fair and legitimate to maintain a fundamentally monopolistic system? Who is responsible for the failed liberalization of all the new added-value services that the European Community is trying to impose on us with a series of directives that are regularly violated? Will we also achieve at least a partial system under which cellular automobile telephones are demonopolized?

The Scenario

The most credible forecasts indicate a truly colossal growth opportunity: from 7 to 10 million users in Europe by the year 2000, with over 40 trillion lire in business. This is by no means an unrealistic estimate considering that the North American market, which is typical of the market's trends and growth problems (excluding service), already counts 900,000 users, with a growth of 20,000 a week.

In Europe, the market is currently quite uneven. Great Britain is in first place in both sales and technology (400,000 subscribers and a growth rate of 10,000 a month), and all the northern countries, where the radiotelephone, which was introduced in the 1960's, is now a widely used instrument. Germany is midway between, while France brings up the rear with 15,000 users and a currently decrepit technical system that does not yet utilize cellular technology even partially.

In Italy, automobile phone service was initiated in 1973 but began to be marketed widely only 4 years ago. Subscribers number about 35,000, but the market is set to take off rapidly. SIP forecasts that the market will double this year, though there are a number of problems due to the country's mountain regions, which adversely affect low-power mobile radio transmissions, and to frequency saturation. At present, Italy has two networks existing side by side: the old, noncellular first-generation network operating on 160 MHz (calls must go through the SIP operator and cannot be received directly) and the analogical "cellular" system on 450 MHz, which is also near the saturation point. Its 200 radio channels allow for a theoretical capacity of 80,000-100,000 users, but in some high-traffic zones (Rome, Milan, Turin) the system is already overloaded.

The European Network

What should be done? The point of approach is the European 900 MHz digital system, which is the product of the agreement signed in Bonn on 19 March 1987. It standardizes technology, services, and procedures. The administrative mechanisms will be studied; these include billing compensation and standardized regulations. Thus, each country will be able to supply service to any foreign citizen who passes through with the proper equipment. In this context, an initial outline agreement was signed last 15 December by STET [Telephone Finance Corp.] and British Telecom. Meanwhile, all the frequencies necessary (890-915 and 935-960 MHz) will be reserved in each country. These are no quick and easy tasks. The frequency band could be 40 percent assigned by 1991 and entirely so only by 2001. The main European urban areas will be covered only by 1993 and the arterial routes by 1995.

The Italian postal minister and SIP have conceived of a transitional cellular system, still at 900 MHz, but analogical, that would go on-line in time for large-scale experimentation, with personal portable phones in time for the 1990 World Cup.

The intermediate network did not disappear with the European cellular system; rather, it will parallel it and be integrated into it together with the old 160 MHz network (which will be "modernized" and dedicated to special services) and the present 450 MHz system. Within 10 years, an enormous integrated radio telephone system will be built in which various systems will operate as a gigantic extension of the traditional public telephone system.

There will be five main types of interconnection: traditional telephones, fixed radio systems (rural telephones, which are more economically tied in through cable installation), the personal cellular phone, and the low-power system. (In addition to the domestic cordless there will be Telepoint—a small instrument the size of a pack of cigarettes able to operate over a distance of some tens of meters through special urban "switchboards".)

The Business

Increasingly rapid steps are being taken in this direction. In Europe, a great race has begun to form alliances, consortiums, and operating agreements. Even in Italy, telecommunications businesses have been getting together. This move is being made in two directions. The first direction involves the planning, construction, and installation of equipment (terminals, computers, radio links); the second, which is even more important though fraught with unknowns, involves managing the new services complementarily or competitively with the traditional SIP management.

To construct the radio-station base, Telettra has put together an agreement with the French company Matra, while Ducati Electromechanics has allied with the Finnish company Nokia-Mobira to build and market portable terminals; 3 weeks ago Ducati made an agreement with the Italian branch of AEG-Olympia to operate in a partial but rather important segment of the new "business": system trunking. This system will comprise the networks arising from the recovery and optimization of the old 160 and 450 MHz radio frequencies now used for mobile telephones. These frequencies are close to complete saturation, but they should be freed up with the transition to the European digital radio telephone operating on the 900 MHz frequency.

The development of the bridge system in Italy leading to the European network has been entrusted to a consortium of Italtel and the Swedish company Ericsson (already operative, except for the general agreement that Italtel is setting up with an important foreign partner). The intermediate network will have a capacity of 250,000 users by 1993. Italtel will produce the basic

radio stations and the terminals. Ericsson, through its Italian associate Fatme, will be in charge of the switchboards and the system's operating software.

The Ericsson alliance appears to be a strategic choice, at least in the case of cellular telephones. The Swedish company is indeed on its way to becoming the largest operator in the European system. Not only does it loom large in the Scandinavian market (the largest in Europe with more than 300,000 users), but it has already launched a widespread network of alliances, both with Italtel and with the German company Siemens and the French company Matra.

The Leadership

But, while forces are being redistributed and technology is advancing, great unresolved questions remain to disturb the protagonists' strategic effort. They involve the complex legal and administrative redefinition that could favor the new business but might also slow it down.

The way is theoretically open to standardize service. The European market is already quite homogeneous. The highest costs are found in Germany: Installation costs 5-6 million lire, and service charges about 3 million lire a year. In Great Britain and the Scandinavian countries, installation costs a little more than 3 million, with average use fees of about 2 million a year.

In Italy, the prices are slightly higher: 3.5 million lire for installation, with a better range of service than in Great Britain, where, however, the switching is slightly more expensive.

To what extent can costs be reduced? There is a lot of margin in rates and even more in hardware. It is significant that this has happened in the United States. There, the free market economy is highly developed, and permits are easily obtained; many companies operate in close competition with one another. Communication costs average 25-45 cents a minute, with discount packages of $125-150 a month (30-40 percent less than in Italy).

In Europe, England provides the main vantage point from which to examine the opportunities, advantages, and risks of partial liberalization. In that country, personal radio telephone service has been managed since 1983 under a system of government license to two companies: Cellnet (a joint venture between Securior and British Telephone) and Racal-Vodafone. The basic rates are the same: an "agreement" (or a "cartel" policy, cynics say) prevents price decreases.

However, there is competition for geographical areas and the company-customer communications system. New areas to cover are continuously being sought after (so that new customers can be "captured"). Services are sold by middlemen who rent or sell equipment and take care of administrative details for the users.

Many middlemen work with both companies and continuously jockey for the best deal in supplies and small customer discounts: The equipment is generally sold at cut rates and the money recouped through volume.

Resistance

British analysts maintain that the system works to everyone's benefit. In any case, both companies are increasing their profits, middlemen are experiencing rapid market growth, and users can always choose between two management systems in direct competition with one another, at least in terms of quality and accessories.

A system of controlled liberalization, in which the market is open to private companies, is also under way in other countries. In France, there is still no true, operative cellular system, and the 200-MHz television band is being used to increase the number of channels. However, a second network will be operating by next year, that of the private General Water Co. [CGE].

What is happening in Italy? Aside from the academic discussion among experts and operators, everything is at a standstill. EEC directives on the gradual liberalization of telecommunications services continue to be received grudgingly and applied as slowly as possible.

The time-worn institutional debate on redefining the limits of monopoly and regulating private business has produced only a few legislative bills, and these are languishing in parliamentary committees.

Even the national plan on radio frequencies (indispensable for any initiative to prevent abuses) has been stalled for years.

The most authoritative specialists warn that this new personal radio telephone race may open a new chapter in the unique, all-too-Italian scenario that has characterized without exception the most recent stages in our telecommunications history, including color television, the emergence of commercial radio, television networks, and "private" data transmission networks.

Everybody seems to be chasing after a business where the line between the legitimate and the illicit has been kept blurred for fear of damaging what theoretically remains a rigid monopolistic system. There are two possible scenarios, both of which are disturbing. One is a frantic spurt in development; the other, more likely, is a new, no-holds-barred battle royal. In the end, this battle will produce handsome profits for someone but will offer very few guarantees to the ones who should be the major beneficiaries of the new technological revolution—the users.

How Much the Automobile Telephone Will Cost

Price of the mobile telephone	3,900,000 lire
Monthly maintenance fee	54,500 lire
Monthly service contract	101,250 lire
Expenses and testing	200,000 lire
Rate per call	
National	5th-rate step
International	normal rate

Source: SIP (rates net value-added tax)

UNITED KINGDOM

Telecom Given Approval for Fiber-Optic TV Trials

55500064 London FINANCIAL TIMES in English 13 Mar 89 p 8

[Article by Hugo Dixon]

[Text] The Trade and Industry Department has given preliminary approval to British Telecom to send television pictures over a fibre-optic communications network for a field trial in Bishop's Stortford, Herts.

The move is a small, potentially significant relaxation in the Government's policy of preventing BT and Mercury, its rival, from networking television. It might give British manufactures, which have developed key fibre-optic technologies, valuable experience in building the networks.

Telecommunications operators across the industrialised world, in the U.S. and Japan as well as in the UK, have been urging governments to let them put out television and telephone traffic on the same networks.

That has been resisted until now on the ground that the operators would add television-distribution monopolies to their telecommunications monopolies.

Those policies were criticised in that they retarded investment in fibre-optic networks. The networks can carry an almost infinite amount of information. However, operators say it does not pay to install them for residential clients if they are prevented from delivering television, which they consider the most attractive earner.

There have also been worries that UK industry might lose its strong position in fibre-optic technology if a market for its products were not allowed to develop. Fibre-optics are being installed on BT's long-distance routes and for business users but volumes are not big enough to cut costs of some components such as lasers.

BT said the decision in principle to let it proceed with a field trial would give UK industry hands-on experience of supplying the system, and a competitive edge.

It was still discussing how to proceed with the trial, which it expected to undertake with manufacturers. The most likely companies are STC, GPT and BICC.

The Government has made clear that its overall policy of preventing BT from putting television down its network will not be changed, at least until November 1990.

Minister Says 32 More Satellite TV Channels Planned

55500063 London THE DAILY TELEGRAPH in English 15 Mar 89 p 8

[Article by Jane Thynne]

[Text] Plans to bring another 32 satellite television channels to Britain within three years were announced yesterday.

Coincidentally, Mr Renton, Home Office Minister for broadcasting, will give the Government's agreement today to a treaty between the 22-member countries of the Council of Europe on European standards for television sex and violence.

It establishes guidelines on television standards and agrees "where practical" to devote the majority of airtime to European-produced programmes.

A spokesman for SES, the Luxembourg-based company which owns the Astra satellites, said an application from Retemia, the Italian station which intends to broadcast a strip poker programme called Casino Casino at peak time on Astra, was being considered seriously.

The new European treaty would not outlaw Casino Casino, nor would the British watchdog body, the Broadcasting Standards Council.

Lord Rees-Mogg, the council's chairman, said this week that "mildly titillating but not highly pornographic material" would be permissible on satellite television.

A second Astra satellite, bringing another 16 TV channels to Britain, will be launched by the end of next year, and a third in 1992, based on the financial success of the second, Mr Robin Crossley, Astra's distribution manager, said yesterday.

The first Astra satellite, which carries the four channels of Mr Rupert Murdoch's Sky Television and eight other channels, was launched last month.

The announcement means that by 1992 owners of the Astra dish in Britain could receive 48 channels on the same dish, although in practice only around 33 will be transmitted in English as not all Astra channels are targeted at the United Kingdom.

Channels on the second Astra, which has so far cost L100 million, are now doubly oversubscribed. It will be launched earlier than was originally planned after SES bought a part-built United States spy satellite which already had a place in the international launching queue.

Record Telecom Modernization Underway in Ulster
55500055 Belfast NEWS LETTER in English
31 Jan 89 p 21

[Text] The biggest modernisation programme in the history of telecommunications in Northern Ireland is now well under way.

And British Telecom is spending £30 million a year to ensure that the telephone revolution will be completed in the 1990s.

More than 80,000 customers around the Province are enjoying the benefits of being connected to ultra-modern digital telephone exchanges. Forty-six of these exchanges are now in operation and the digital roll-out, designed to take British Telecom's network into the 21st Century, continues apace.

The old telephone network remained largely unchanged since the days of Alexander Graham Bell who invented the telephone back in 1876. And although the old system gave a good service over the years, the advent of modern digital technology brought about the inevitable replacement programme that is now taking place.

For the customer the new hi-tech exchanges mean clearer lines and instant connections as well as a whole host of new facilities which, prior to modernisation, could only be found on larger office switchboards.

These "Star Services"—named after the star button on the new-style TouchTone telephones—are turning the telephone into a remarkably intelligent piece of equipment.

The modernisation programme, which is revolutionising the United Kingdom's telephone network is costing British Telecom £2 billion a year—£5 million a day—nationally.

The task of replacing all of the United Kingdom's 6,500 exchanges—nearly 200 of which are in Northern Ireland—will take time, but when the task is completed in the 1990's the UK will have one of the most advanced telephone networks in the world.

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